Morrison

DINOSAURS!

•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•

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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

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DIPROTODON

The gentle, plodding, giant wombat, *Diprotodon*, was one of the biggest marsupial mammals ever known.

As long as a rhinoceros, *Diprotodon* was a chunky, slow-moving animal. It looked very different from the small, furry wombats that live in Australia today. In prehistoric times marsupials (mammals with pouches) were more widespread than they are today. But it was in Australia that they survived most successfully.

LAND OF THE GIANTS

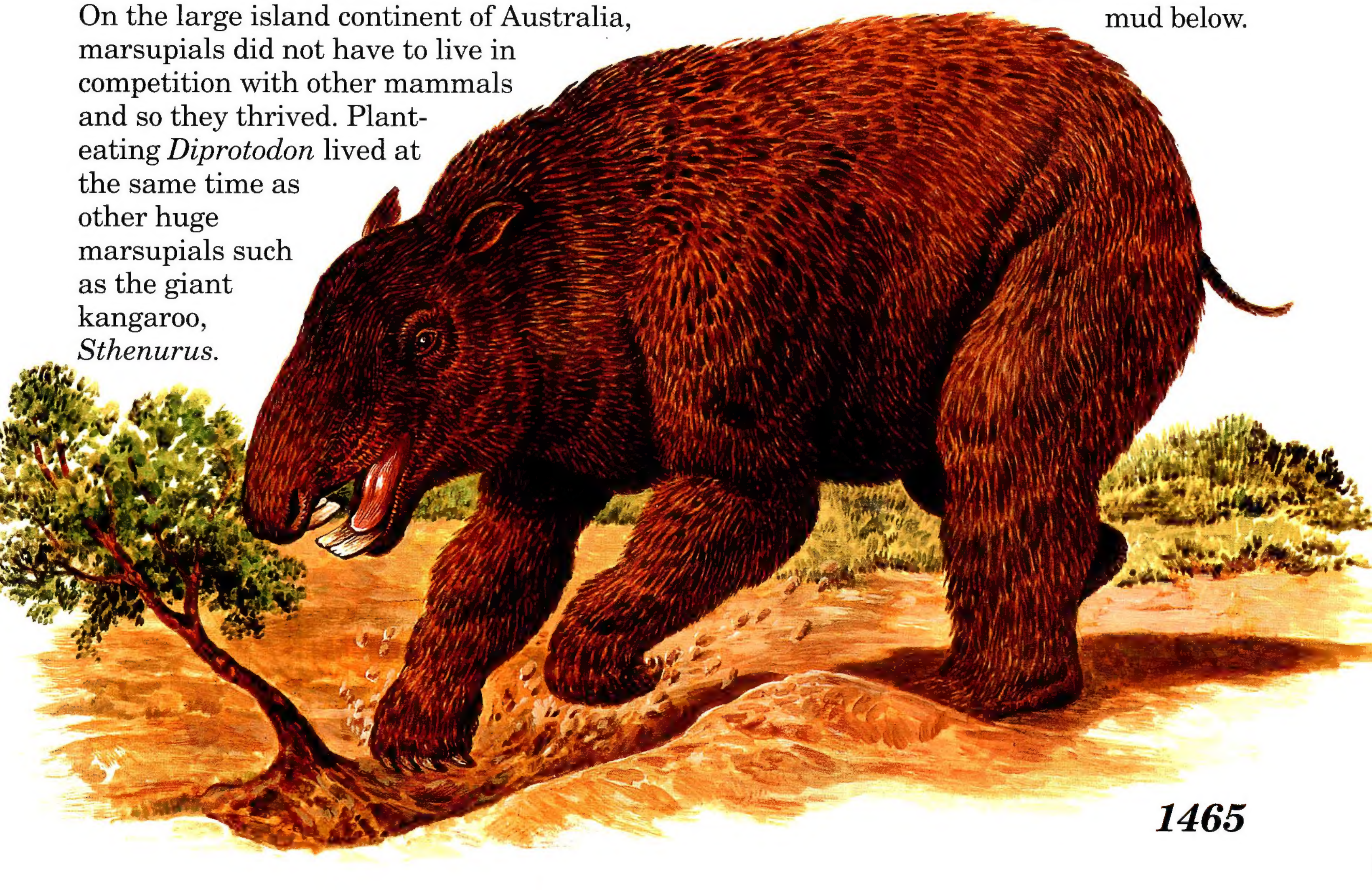
On the large island continent of Australia, marsupials did not have to live in competition with other mammals and so they thrived. Plant-eating *Diprotodon* lived at the same time as other huge marsupials such as the giant kangaroo, *Sthenurus*.

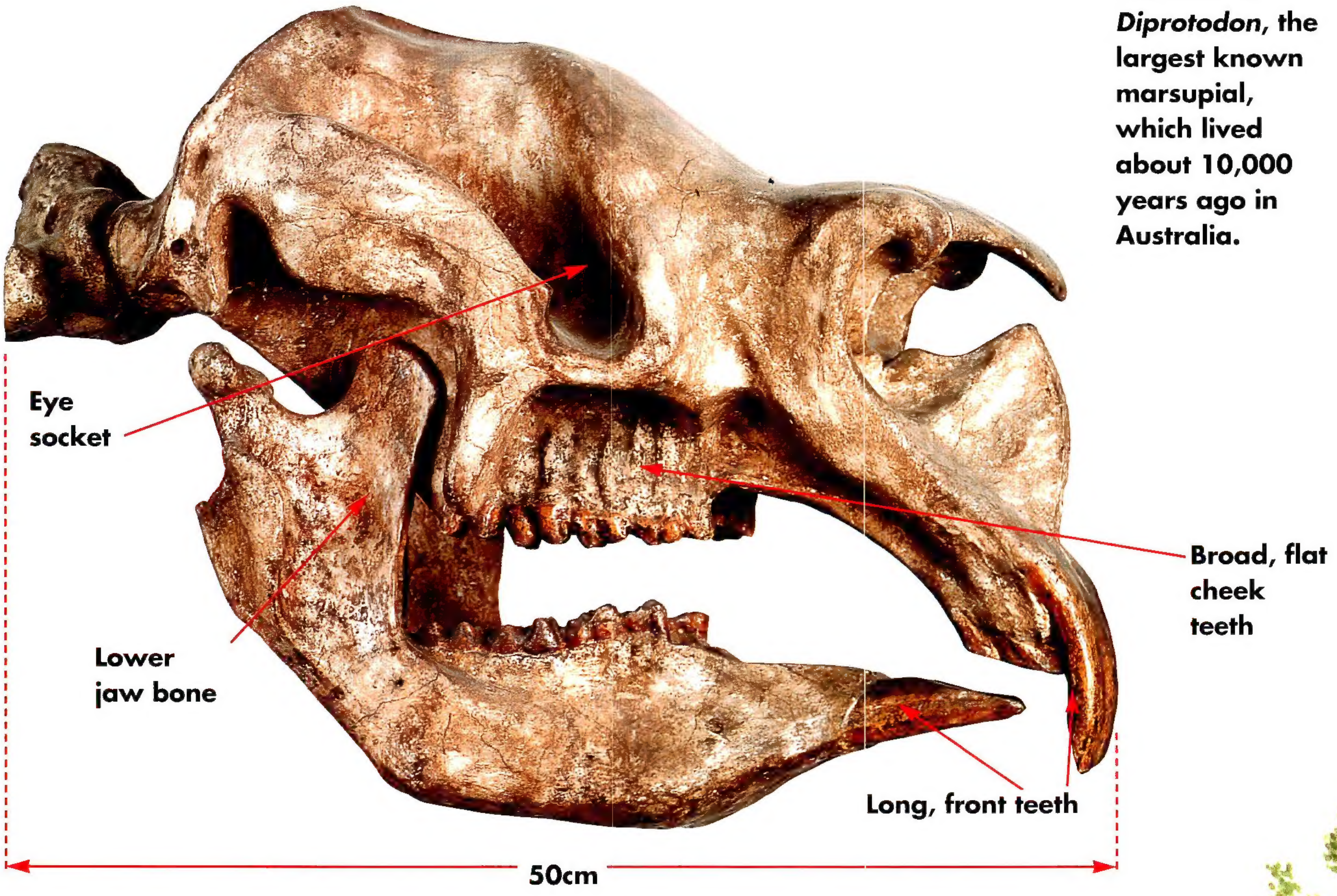
FURRY 'HIPPO'

Imagine the body of a hippopotamus covered with fur, with a huge head at one end and a short, skinny tail at the other. In spite of its size, *Diprotodon* was a peaceful plant-eating creature which browsed on leaves from small bushes.

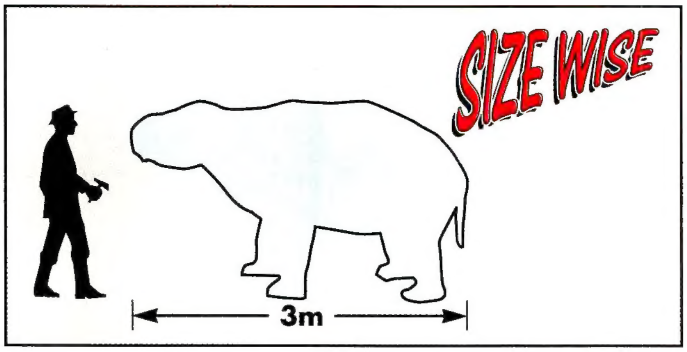
STICKY END

Experts think that *Diprotodon* probably moved around in herds. Fossils have been found at Lake Callabonna in south-east Australia. The *Diprotodons* appear to have drowned when the dried, crusty surface of the lake gave way under their weight and they fell into the mud below.





The skull of *Diprotodon*, the largest known marsupial, which lived about 10,000 years ago in Australia.



MONSTER FACTS

- **NAME:** *Diprotodon* (dye-pro-toe-don) means 'two first teeth'
- **GROUP:** mammal
- **SIZE:** 3m long
- **FOOD:** plants
- **LIVED:** about 10,000 years ago in the Pleistocene Epoch in Australia

USEFUL TEETH

Diprotodon was well-equipped to eat a diet of plants. Its long front teeth stuck out like chisels and were ideal for cropping leaves and digging into the ground to pull out plants. At the back of its jaw, *Diprotodon* had broad, flat cheek teeth for grinding up tough shoots into an easily digested pulp.

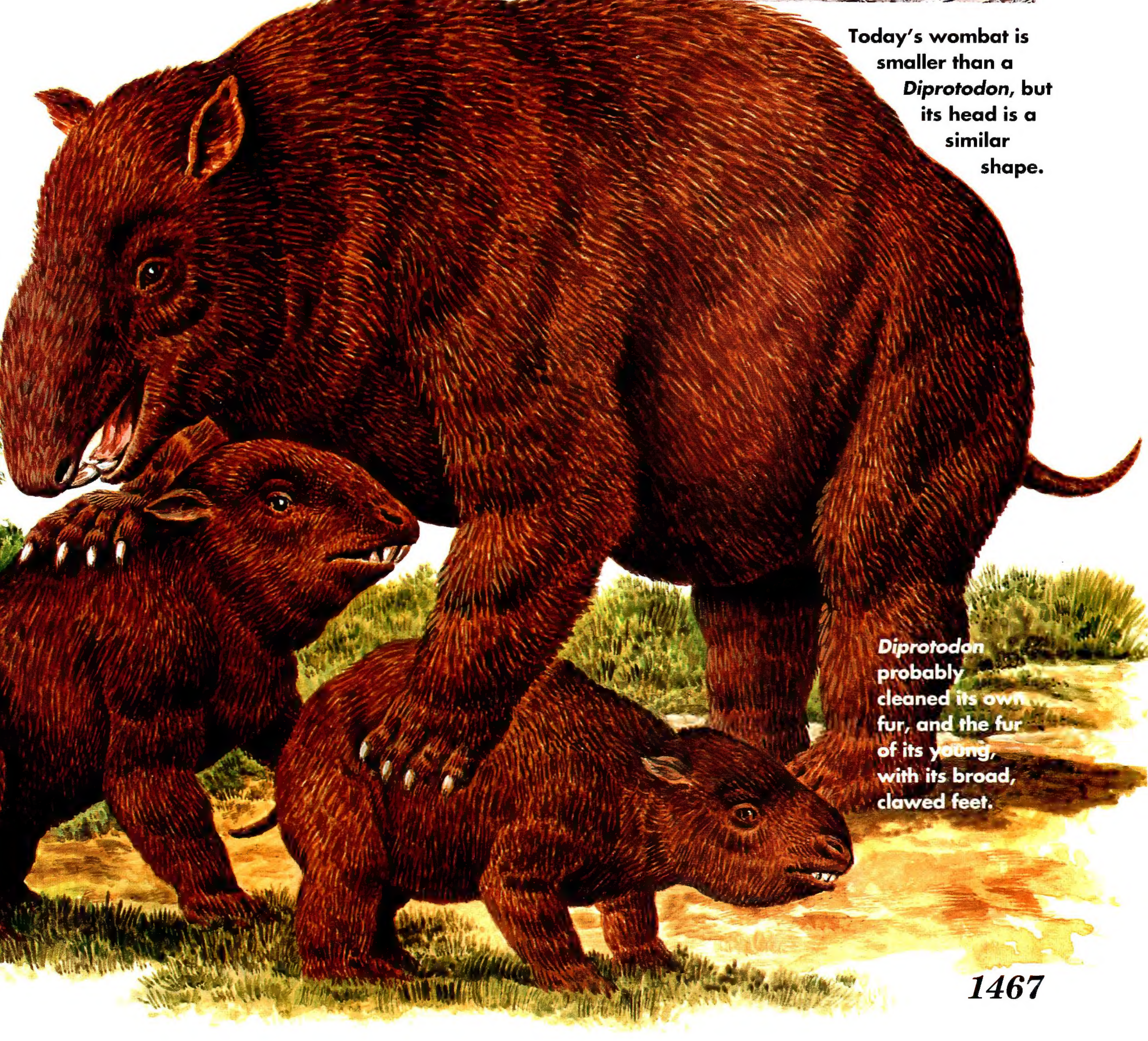
CLAW COMB

Diprotodon's four stout legs were powerfully built. Its feet were broad and sturdy with clawed toes. These claws were used to keep *Diprotodon* clean. It probably groomed its fur by running its claws through its fur like a comb.

DIPROTODON DISAPPEARS

Diprotodon was not a natural athlete and could not rely on speed to keep safe. It was a large and easy target for the bone-tipped weapons of prehistoric people. Some experts believe that this is the main reason why animals such as *Diprotodon* became extinct. Others scientists think that changes in climate led to its subsequent disappearance.

Today's wombat is smaller than a *Diprotodon*, but its head is a similar shape.



Diprotodon* probably cleaned its own fur, and the fur of its young, with its broad, clawed feet.

PROCOMPSOGNATHUS

***Procompsognathus* preyed on fast-running mammals, small lizards and flying insects.**

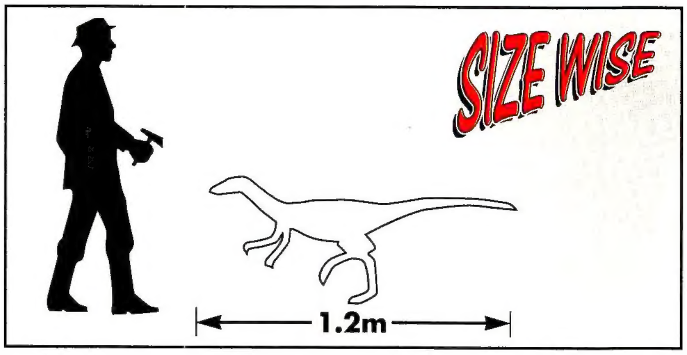
This tiny predator had keen senses and fast reactions. As a lizard or small mammal shot into the open, *Procompsognathus* leapt into action with its head stretched forward and its tail up. It probably hunted in small packs on the dry plains of Triassic Germany.

DAINTY BUT DEADLY

Once caught, it was important for *Procompsognathus* to hold on to its wriggling prey. It grasped the helpless victim with tiny five-fingered hands and tore at the flesh with pointed, curved teeth.

WIDE EYED

A dinosaur as small as *Procompsognathus* needed to stay alert even when feeding. Although its head was small enough to fit into the palm of your hand, its eyes were huge. With small darting movements of its head, *Procompsognathus* resembled a garden bird on the look-out for a cat.



MONSTER FACTS

- **NAME:** *Procompsognathus* (pro-comp-sog-nay-thus) means 'before Pretty Jaw'
- **GROUP:** dinosaur
- **SIZE:** 1.2m long
- **FOOD:** small animals and insects
- **LIVED:** about 215 million years ago in the Late Triassic Period in southern Germany

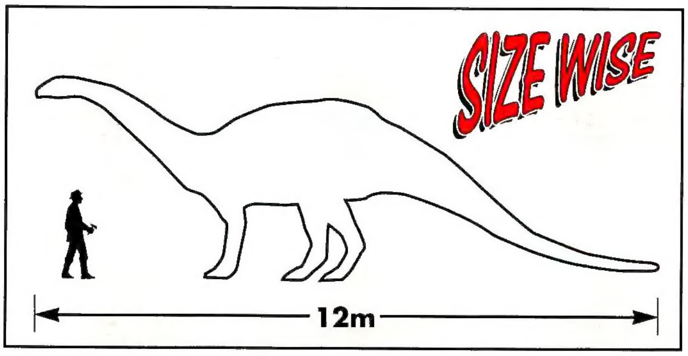
FAMILY MATTERS

Procompsognathus was related to other predators such as *Syntarsus* and *Coelophysis*.

MELANOROSAURUS

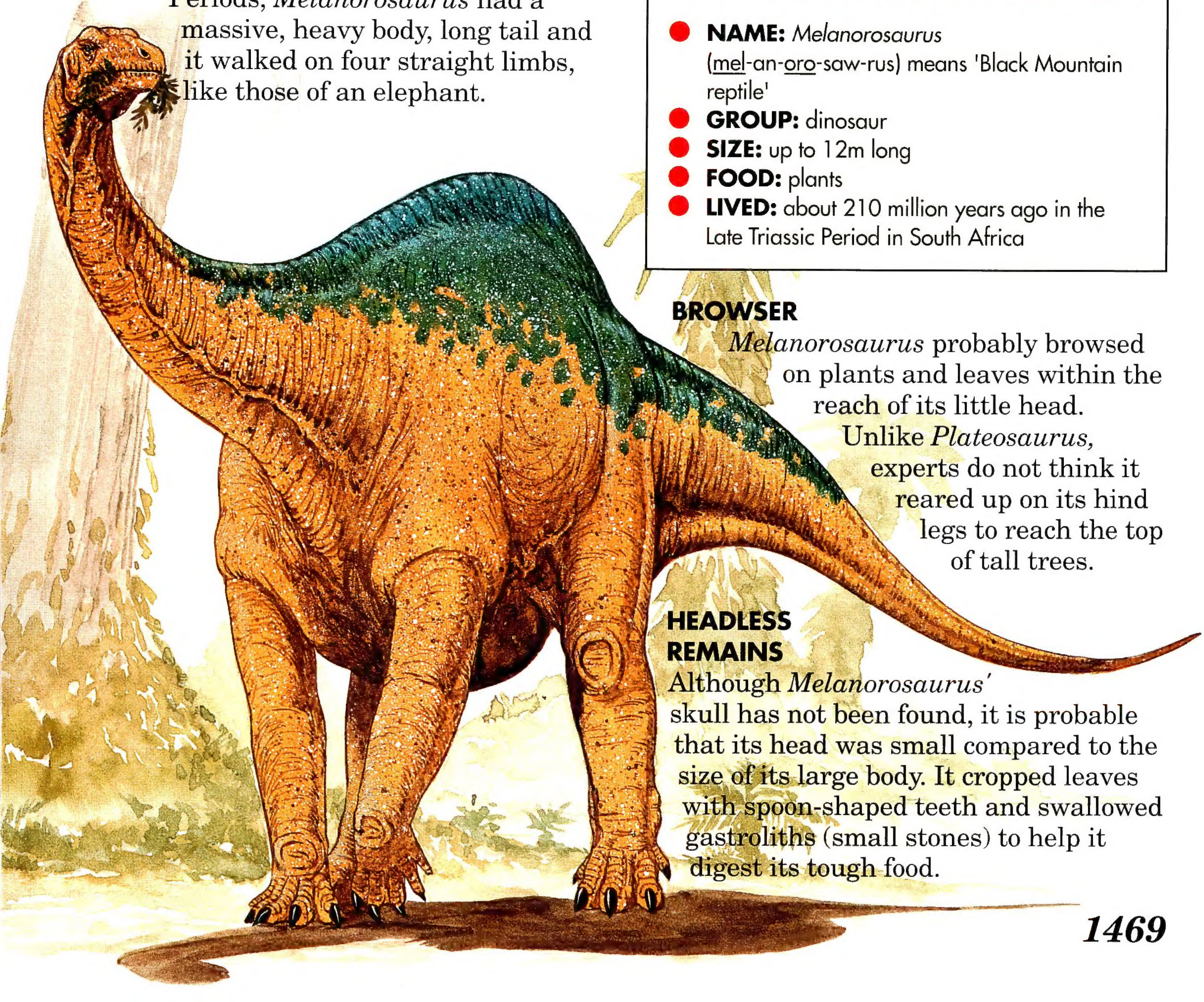
With its elephantine legs and long tail, *Melanorosaurus* was one of the largest of the early dinosaurs.

As long as three cars, *Melanorosaurus* was a huge, plant-eating dinosaur related to *Camelotia* from England and *Riojasaurus* from South America. An ancestor of the great sauropods that lived during the Jurassic and Cretaceous Periods, *Melanorosaurus* had a massive, heavy body, long tail and it walked on four straight limbs, like those of an elephant.



MONSTER FACTS

- **NAME:** *Melanorosaurus* (mel-an-oro-saw-rus) means 'Black Mountain reptile'
- **GROUP:** dinosaur
- **SIZE:** up to 12m long
- **FOOD:** plants
- **LIVED:** about 210 million years ago in the Late Triassic Period in South Africa



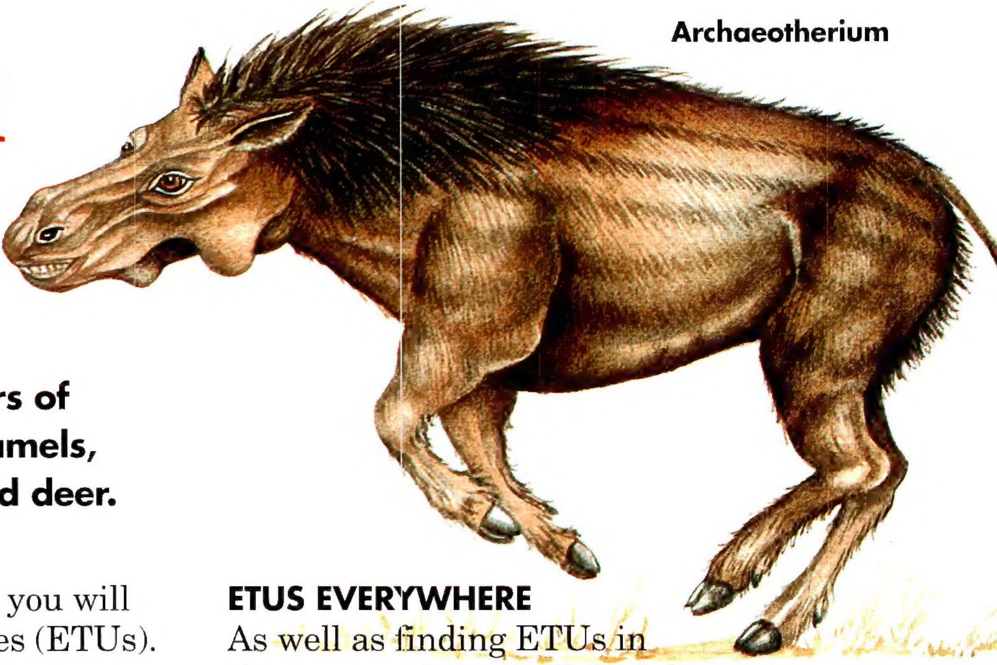
BROWSER

Melanorosaurus probably browsed on plants and leaves within the reach of its little head. Unlike *Plateosaurus,* experts do not think it reared up on its hind legs to reach the top of tall trees.

HEADLESS REMAINS

Although *Melanorosaurus'* skull has not been found, it is probable that its head was small compared to the size of its large body. It cropped leaves with spoon-shaped teeth and swallowed gastroliths (small stones) to help it digest its tough food.

Cloven Hoofs



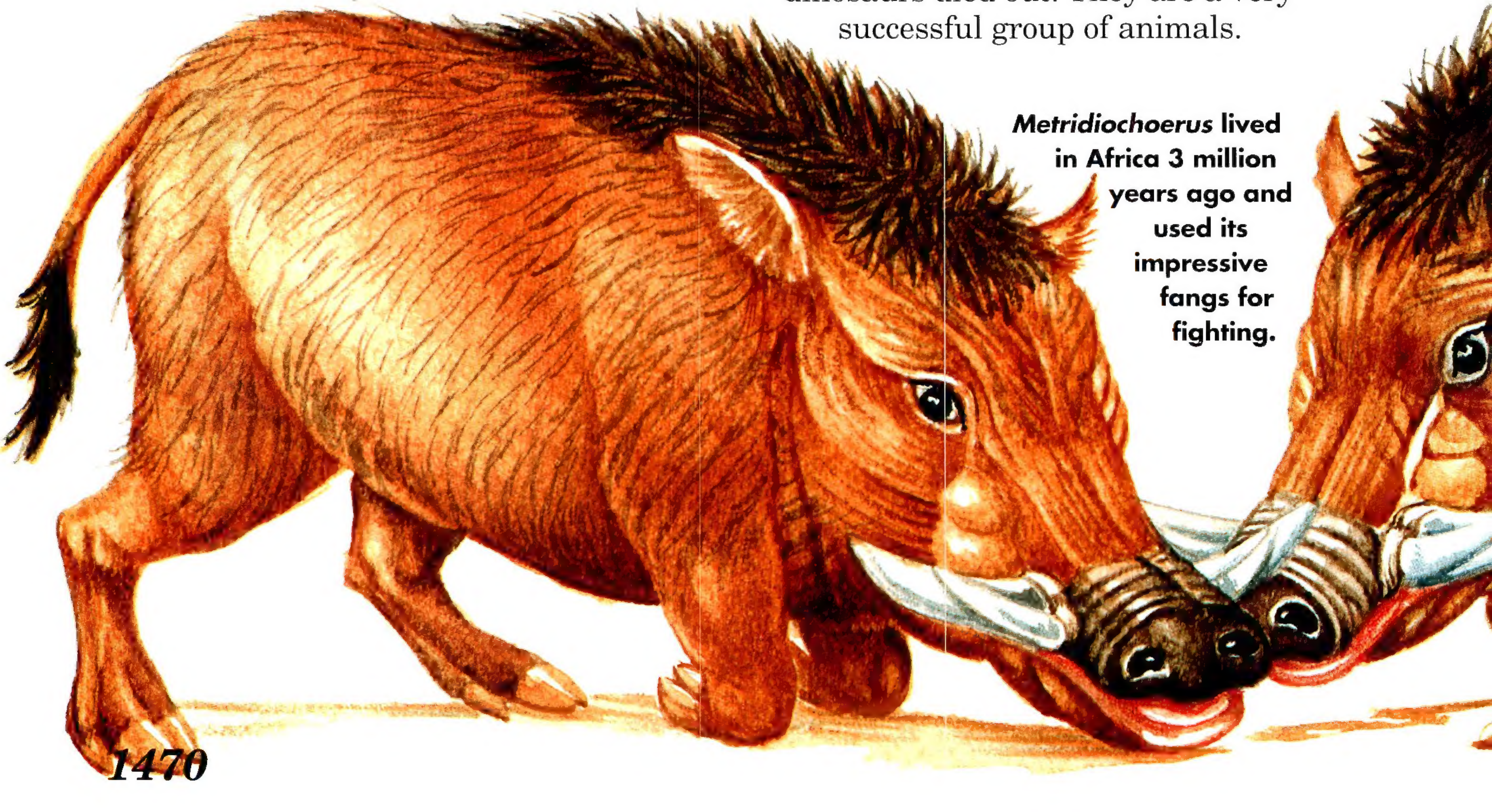
Archaeotherium

Meet the fascinating ancestors of today's sheep, cattle, pigs, camels, giraffes, hippopotamuses and deer.

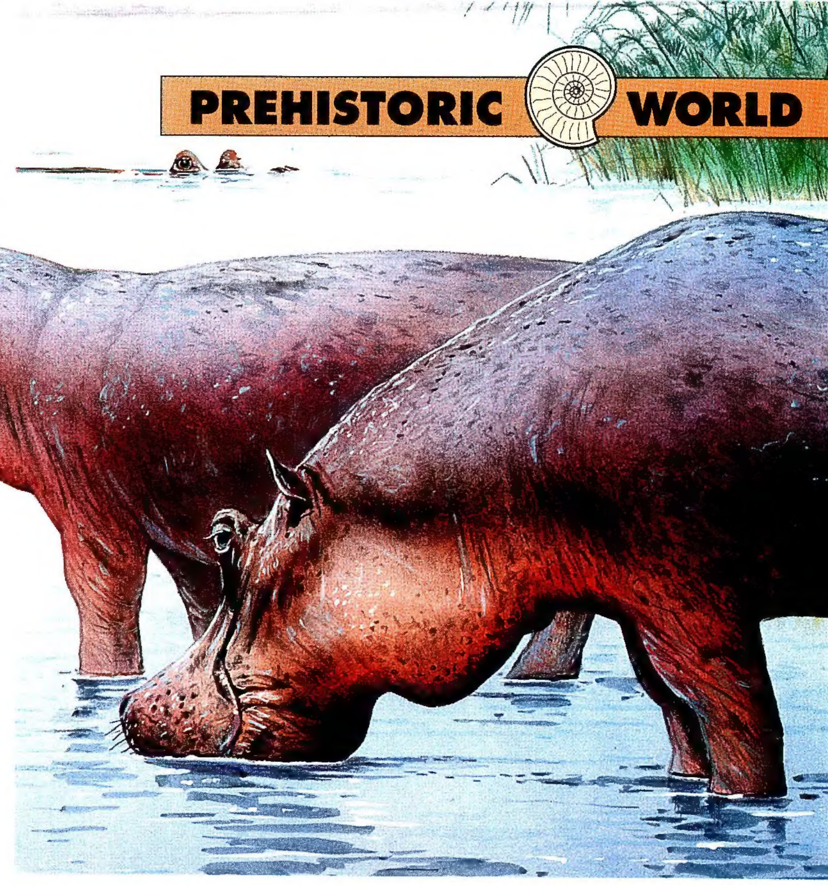
In almost any farmyard you will find even-toed ungulates (ETUs). You know them better as sheep, goats, cattle and pigs. They are called ETUs because they are ungulates (hoofed mammals) and have an even number of hoofs (toes), on each foot. Most ETUs have two hoofs per foot, but some have four. ETUs are also known as 'cloven-hoofed' animals. Cloven means split or divided.

ETUS EVERYWHERE

As well as finding ETUs in the farmyard, you will find them in many other habitats. The deer in the woods are ETUs. So are the camels in the deserts. ETUs on the North American prairies include bison and pronghorn antelopes. In Africa, they include hippos, giraffes and gazelles. Fossils show that ETUs appeared more than 50 million years ago, not long after the last dinosaurs died out. They are a very successful group of animals.



Metridiochoerus **lived in Africa 3 million years ago and used its impressive fangs for fighting.**



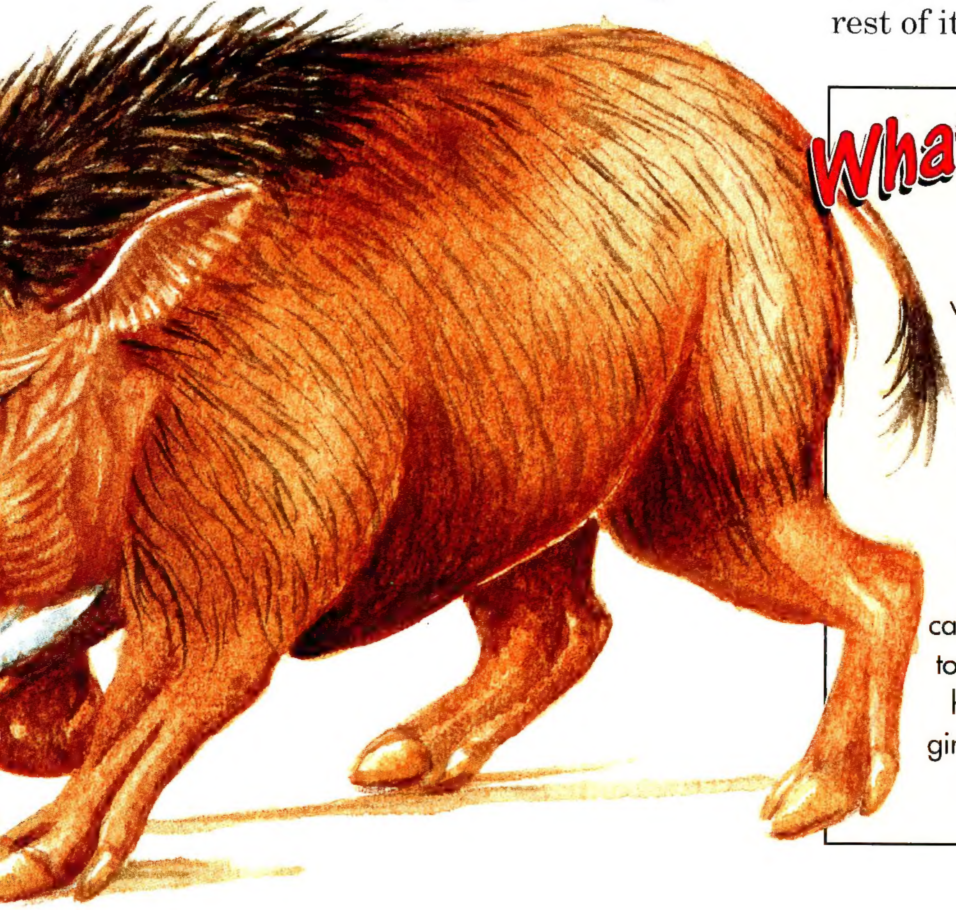
The hippos of today (above) closely resemble their ancestors *Hippopotamus gorgops* (right) from the Pleistocene Epoch.

PIGS AND PRE-PIGS

Some early ETUs looked like pigs, but they were not true pigs. One was *Archaeotherium*, a pig-sized creature with bony bumps on its cheeks and lower jaw. It roamed eastern Asia and North America 30 million years ago, grubbing up roots with its tough teeth. *Dinohyus* lived in North America around 15 million years ago. It looked and lived like a pig, but was in fact bigger than a cow! *Metridiochoerus* was a true pig that lived 3 million years ago in Africa. It had four fearsome fangs that it used for fighting and feeding.

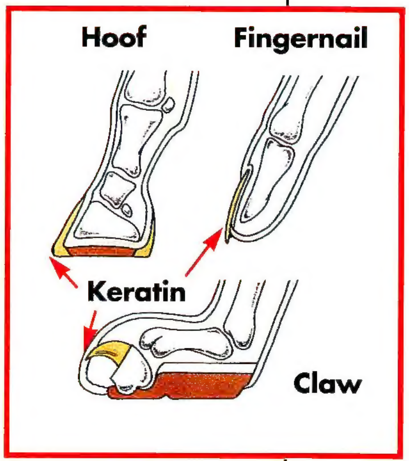
HIPPOS THROUGH THE AGES

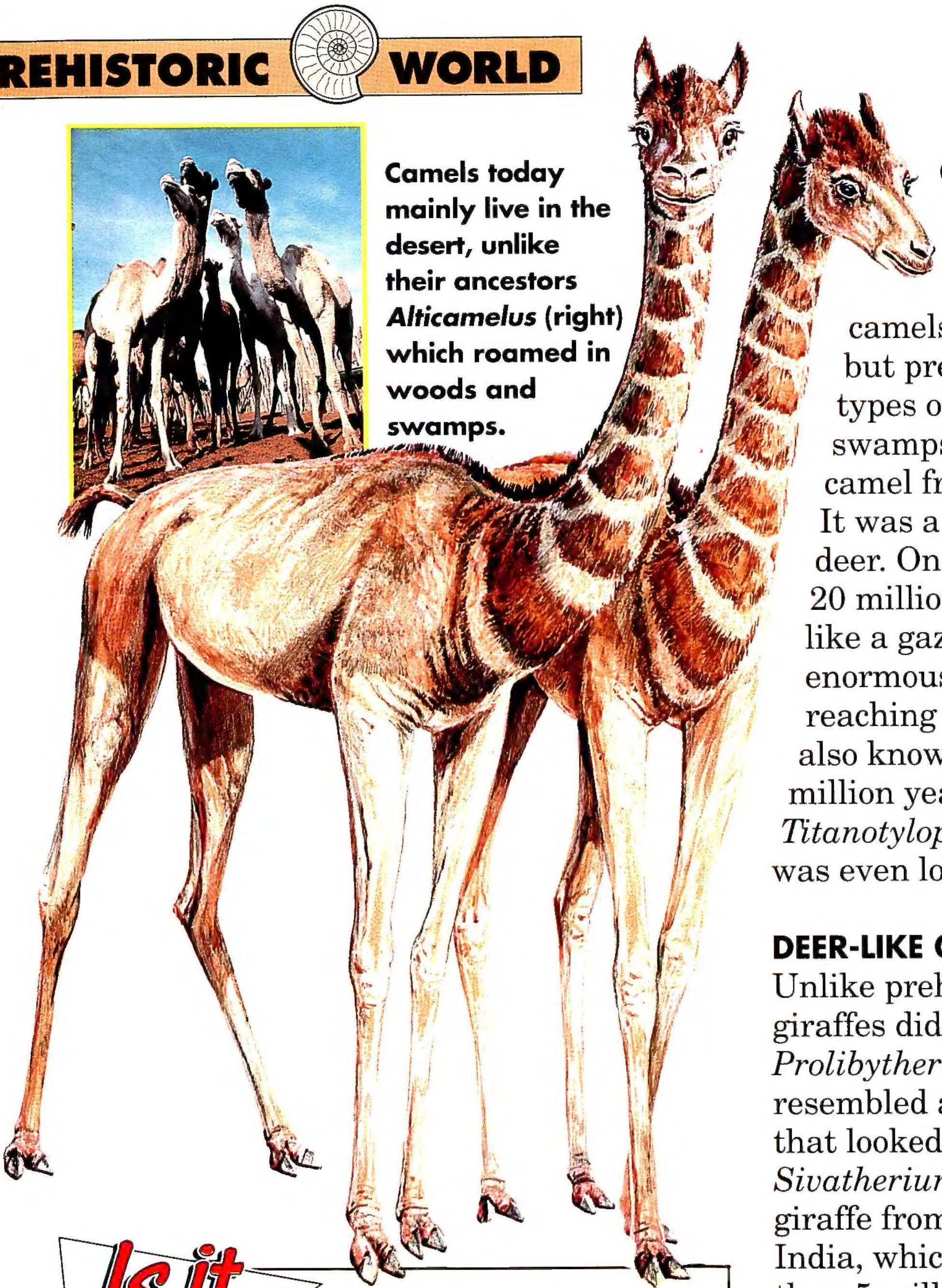
Hippopotamuses are ETUs too. They have had the same shape for millions of years. *Hippopotamus gorgops* lived in Africa over a million years ago. Its eyes were on bony 'stalks' so it could keep watch while the rest of its head was under the water.



What is? A HOOF

It is a large, thick, wrap-around toenail. Hoofs are made of hard, horny stuff called keratin, which also forms nails and claws. Hoofs grow on the toe-tips of the hoofed mammals called ungulates. Even-toed ungulates include hippos, pigs, camels, giraffes, deer and cattle. Odd-toed ungulates include horses, zebras, tapirs and rhinos.





Camels today mainly live in the desert, unlike their ancestors *Alticamelus* (right) which roamed in woods and swamps.

GIRAFFE-LIKE CAMELS

The camel group appeared around 40 million years ago in North America. Modern camels are best suited to desert life, but prehistoric camels lived in all types of habitats, such as woods and swamps. *Protylopus* was a very early camel from south-west North America. It was a combination of rabbit and deer. One metre tall *Stenomylus* lived 20 million years ago and looked more like a gazelle. Some camels evolved enormously long necks, like giraffes, for reaching succulent leaves. *Alticamelus*, also known as *Aepycamelus,* from 10 million years ago, could reach 3m high. *Titanotylopus,* from 2 million years ago, was even loftier, and could reach up to 5m.

DEER-LIKE GIRAFFES

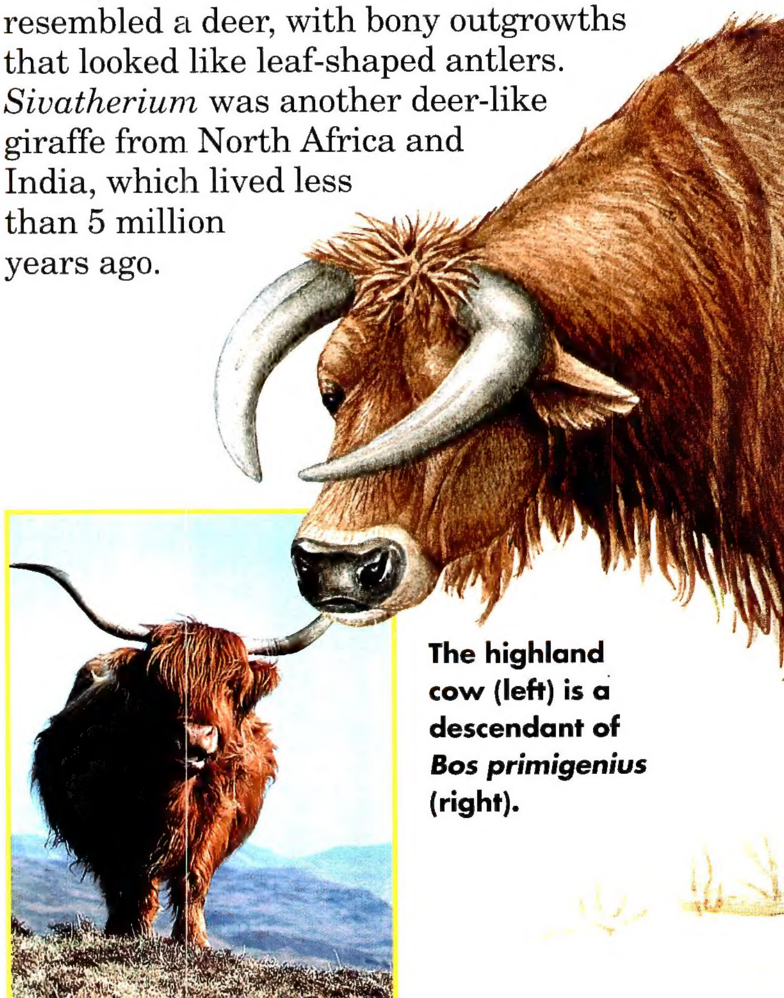
Unlike prehistoric camels, prehistoric giraffes did not have very long necks. *Prolibytherium,* from 20 million years ago, resembled a deer, with bony outgrowths that looked like leaf-shaped antlers. *Sivatherium* was another deer-like giraffe from North Africa and India, which lived less than 5 million years ago.

Is it true that ETUs are the most numerous large mammals in the world?

Almost. There are many millions of wild deer, antelopes and gazelles. There are millions of camels, llamas, alpacas and their cousins. And in addition to these wild ETUs there are also:

- 1,200 million cattle
- 1,200 million sheep
- 500 million goats
- 800 million pigs
- 130 million water buffalo

But there are well over 5,000 million of a single species of large mammal – it is a type of ape. It's the human.



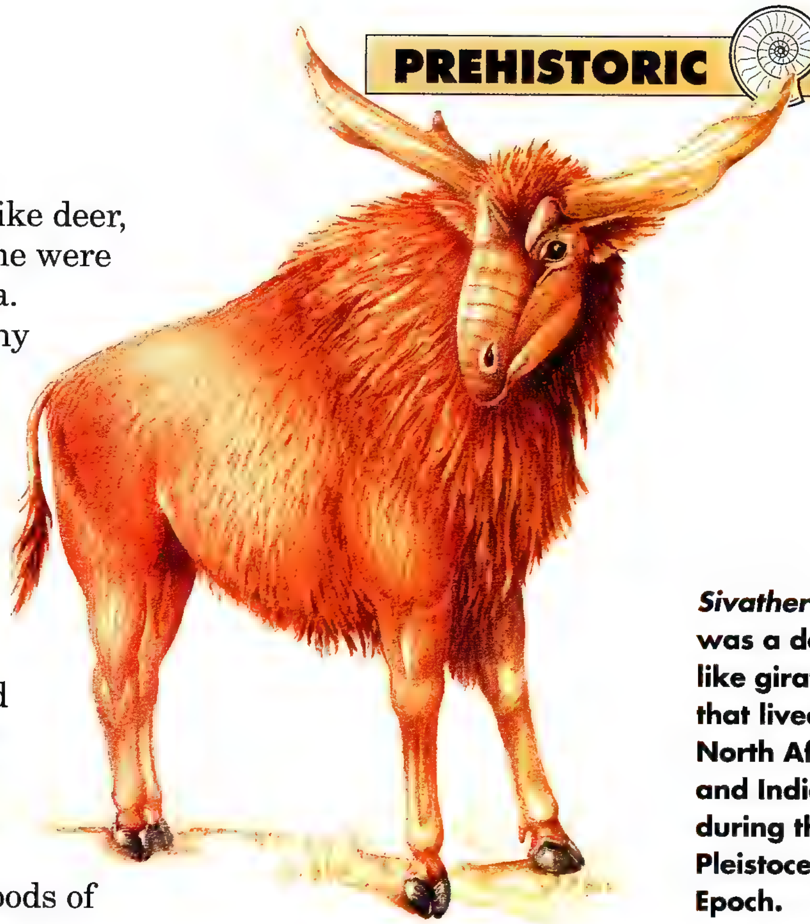
The highland cow (left) is a descendant of *Bos primigenius* (right).

DEER-LIKE, BUT NOT DEER

Many prehistoric ETUs looked like deer, but they were not true deer. Some were 'first horns', from North America. *Protoceras* had three pairs of bony knobs on its face and lived 25 million years ago. Much later, 5 million years ago, came the 2m-long *Synthetoceras*. Its strange-looking nose horn was Y-shaped.

TRUE DEER

The true deer group only evolved recently. The males have antlers that fall off and grow again each year. *Eucladoceros,* for example, had antlers up to 1.7m across. It browsed in the woods of Italy, 3 million years ago.



Sivatherium **was a deer-like giraffe that lived in North Africa and India during the Pleistocene Epoch.**

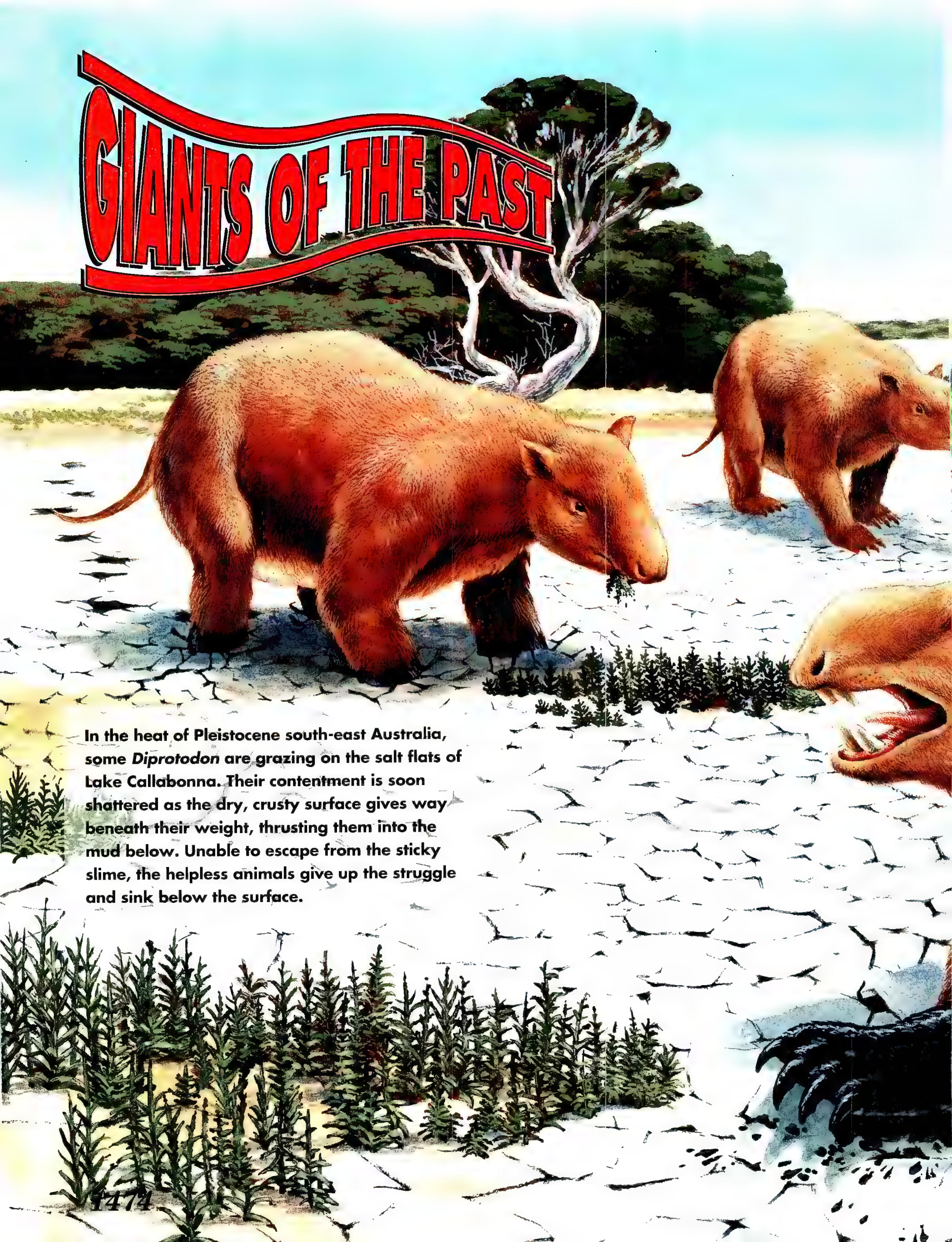
ANTELOPE-LIKE PRONGHORNS

The living pronghorn of North America is the only survivor of one ETU group called the antilocaprids. But in North America 25 million years ago there were many animals in this group. *Ilingoceros* was an antilocaprid with twisted antlers. *Hayoceros* was another and had two sets of antlers.

COWS, THEN AND NOW

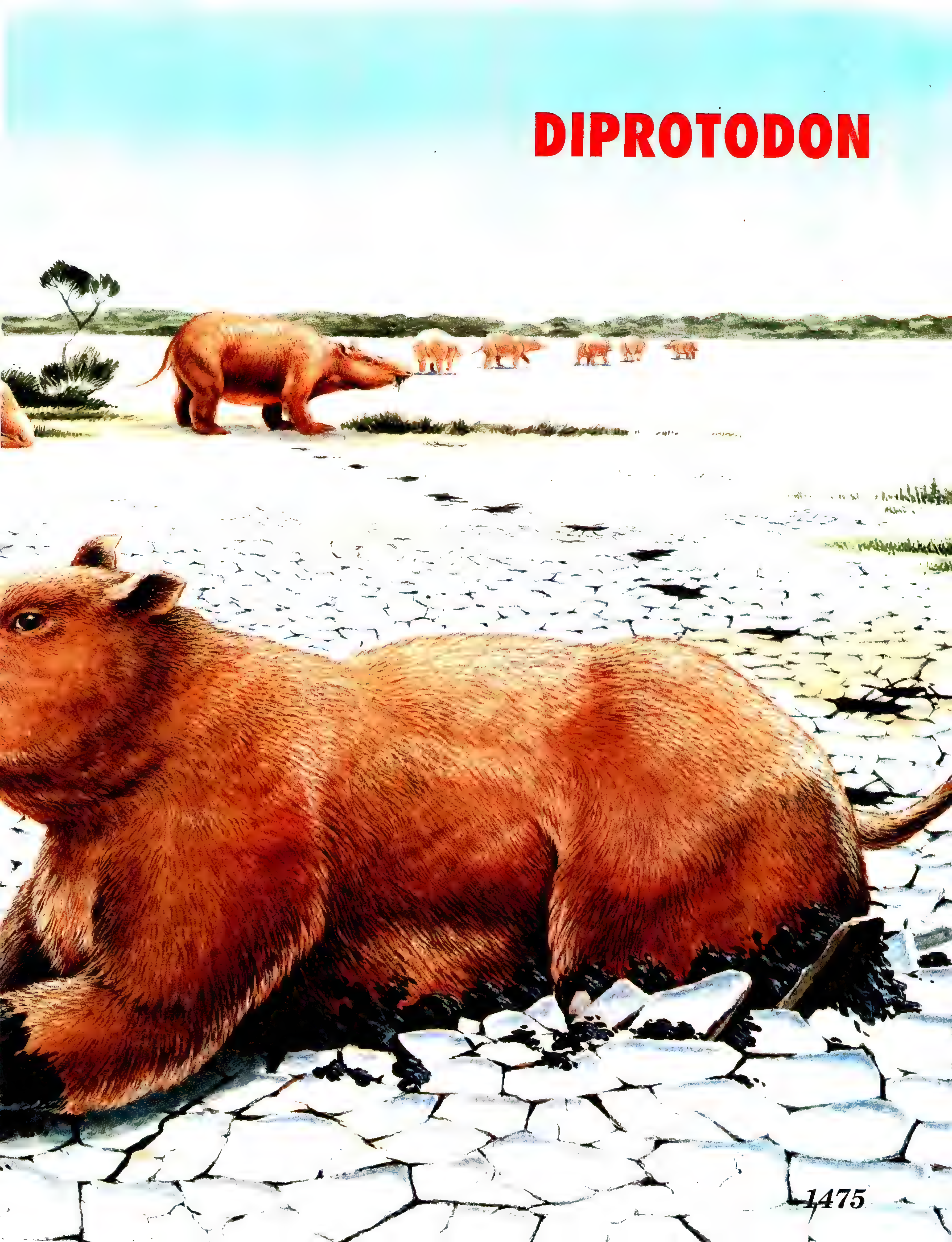
Another big group of ETUs includes the antelopes, gazelles, cattle, sheep and goats. *Gazella*, from 20 million years ago, was one of the earliest. The cattle you see in the fields today were mostly bred from wild cows called aurochs. *Bos primigenius* was a huge auroch, more than 3m long, which lived in Europe, Asia and North Africa for a million years. The last ones died less than 400 years ago.

GIANTS OF THE PAST

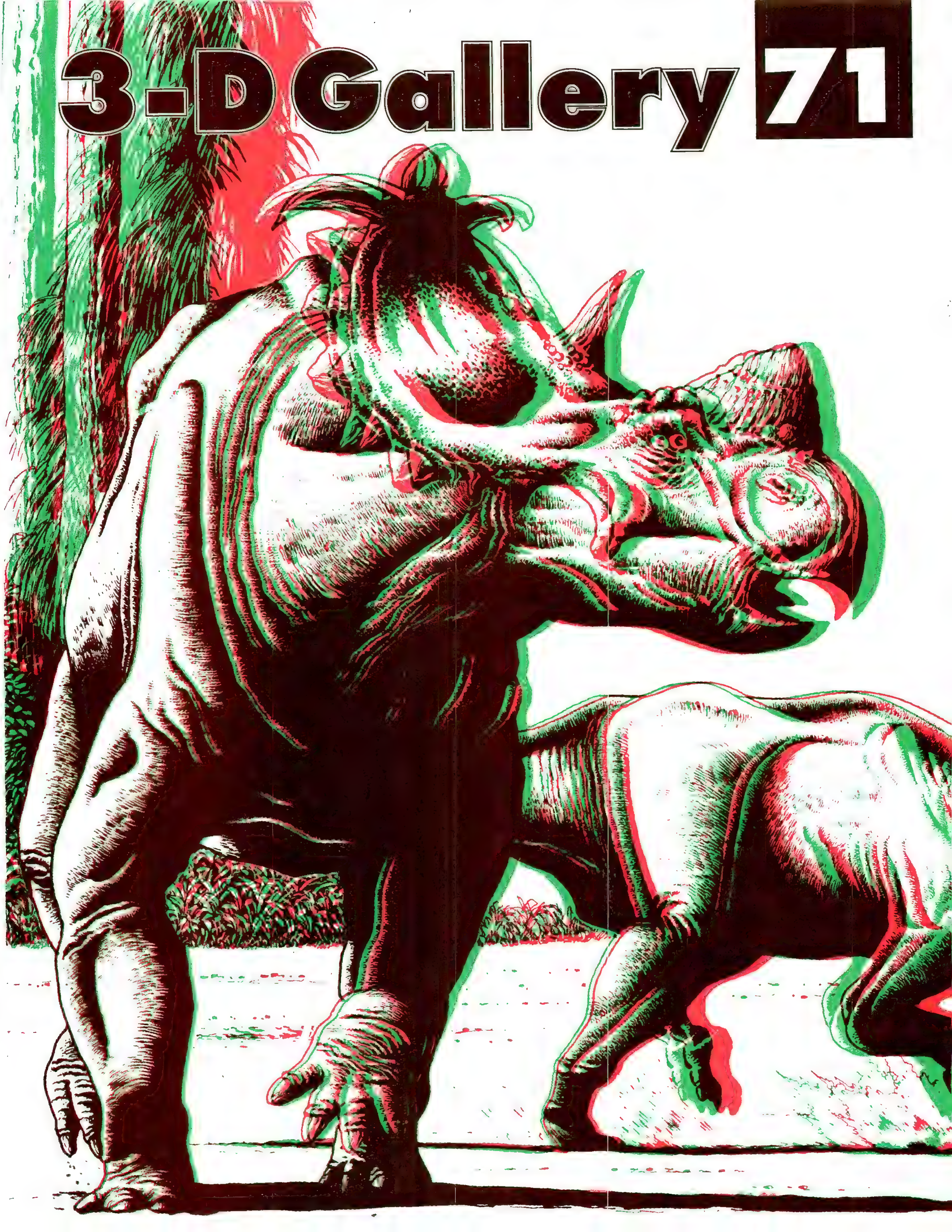


In the heat of Pleistocene south-east Australia, some *Diprotodon* are grazing on the salt flats of Lake Callabonna. Their contentment is soon shattered as the dry, crusty surface gives way beneath their weight, thrusting them into the mud below. Unable to escape from the sticky slime, the helpless animals give up the struggle and sink below the surface.

DIPROTODON

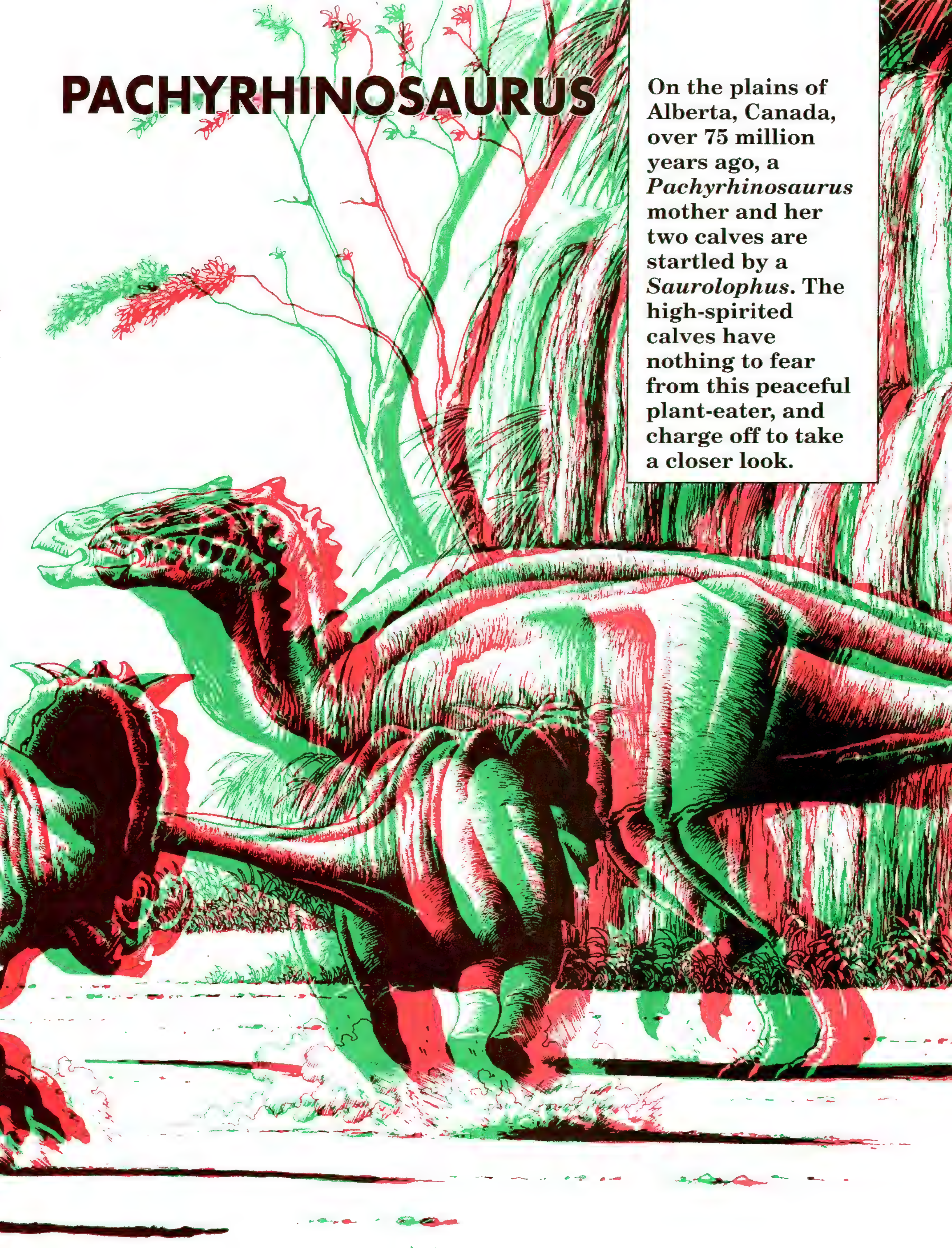


3-D Gallery 71



PACHYRHINOSAURUS

On the plains of Alberta, Canada, over 75 million years ago, a *Pachyrhinosaurus* mother and her two calves are startled by a *Saurolophus*. The high-spirited calves have nothing to fear from this peaceful plant-eater, and charge off to take a closer look.



The packs

On the great plains of Africa, jackals and vultures feed on the remains of a gnu after the bigger predators have eaten their fill.

If animals hunt together in packs, can it make it easier for them to catch and kill prey?

Imagine if you had to hunt for your own food. It would not be very easy because most animals can run faster than you can. You could get together with some of your friends and plan the hunt together. Some of you could start the chase, others could head the animal off, or divert it, and yet others could lie in wait to make the actual kill.

GETTING THE ACT TOGETHER

This is how some animals hunt. Dogs, such as the wolves and the Cape hunting dogs, are the masters of co-operative hunting. In the past, people have made use of the pack-hunting ability of dogs to catch deer and other animals. Even today packs of hounds are kept for hunting.

CO-OPERATIVE DINOSAURS

Experts think that some dinosaurs hunted in groups. When *Deinonychus* was first discovered in the late 1960s, several skeletons were found around the remains of the big plant-eater *Tenontosaurus*. It could be that a pack of *Deinonychus* attacked one animal, and some of them were killed in the attempt.

SOMEONE ELSE'S LEFTOVERS

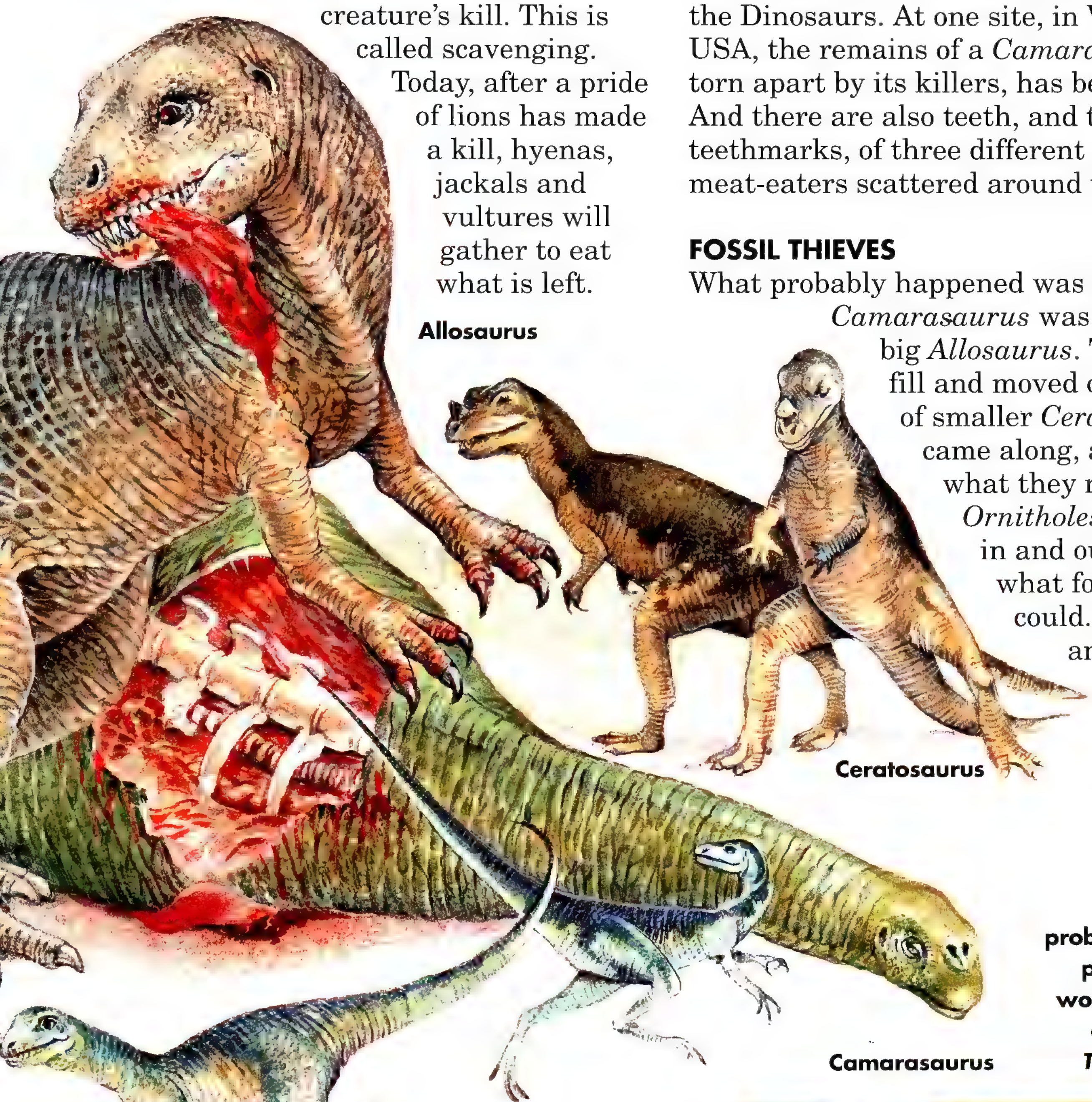
Another way for a carnivore to find meat is to dine on the leftovers of another creature's kill. This is called scavenging. Today, after a pride of lions has made a kill, hyenas, jackals and vultures will gather to eat what is left.

ANCIENT EVIDENCE

There is plenty of evidence that scavenging took place during the Age of the Dinosaurs. At one site, in Wyoming, USA, the remains of a *Camarasaurus*, torn apart by its killers, has been found. And there are also teeth, and the teethmarks, of three different types of meat-eaters scattered around the site.

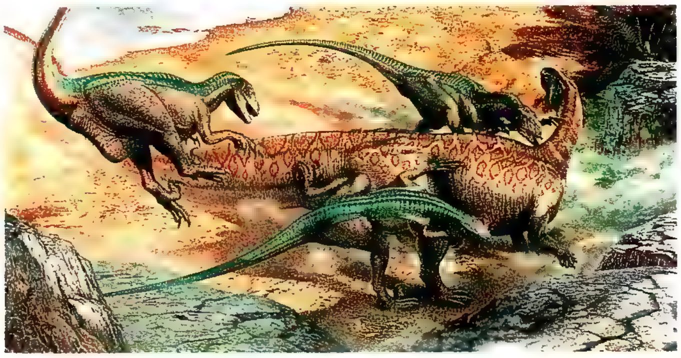
FOSSIL THIEVES

What probably happened was that the *Camarasaurus* was killed by a big *Allosaurus*. This ate its fill and moved on. A group of smaller *Ceratosaurus* came along, and ate what they needed. Tiny *Ornitholestes* darted in and out taking what food they could. Maggots and beetles would also have enjoyed a meal.



Evidence has been found in an incomplete *Camarasaurus* skeleton that it was partly eaten, probably by an *Allosaurus*. Other scavengers, such as *Ceratosaurus* and *Ornitholestes*, also came for a share.

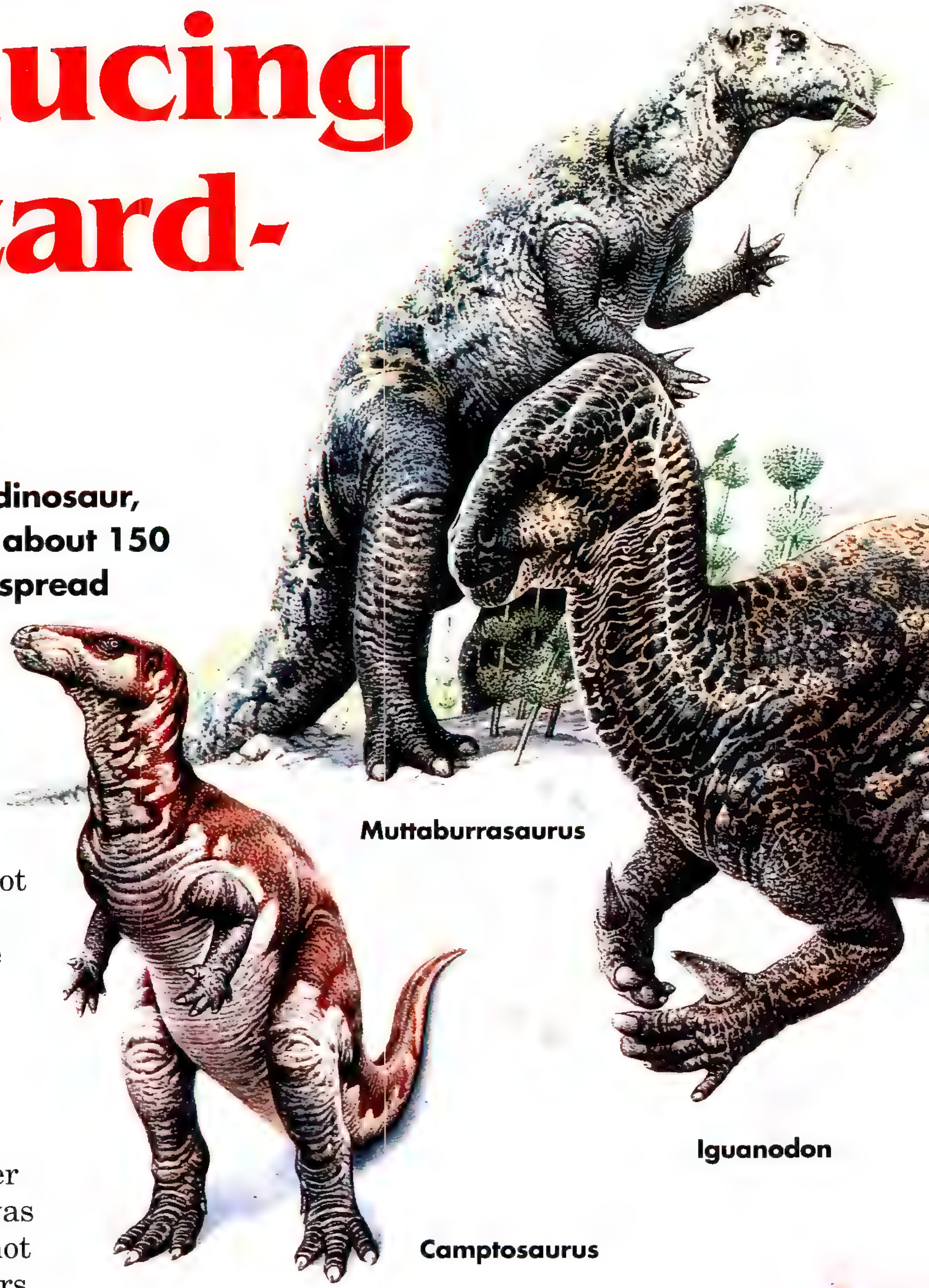
Deinonychus probaby hunted in packs and they would have been able to kill big _Tenontosaurus_.



Introducing the lizard-teeth!

A new type of plant-eating dinosaur, as big as a truck, appeared about 150 million years ago and soon spread throughout the world.

The lizard-teeth dinosaurs, or iguanodontids, took over from the long-necked sauropods. They were not as big, but they were very successful. By the middle of the Cretaceous Period, large numbers of lizard-teeth dinosaurs roamed the land.

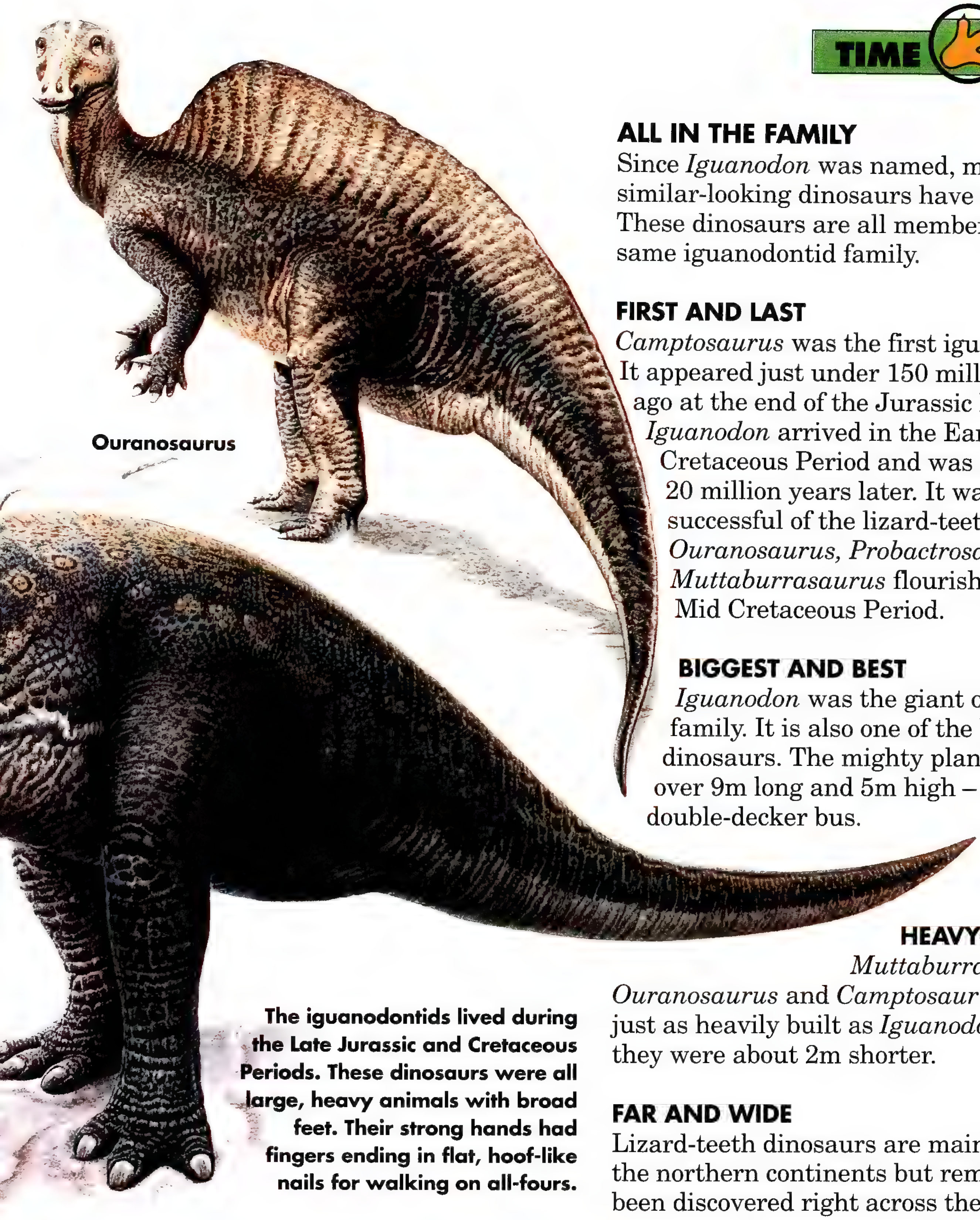


LOOK-ALIKE

Iguanodontids were named after *Iguanodon*. When *Iguanodon* was first discovered, scientists did not know very much about dinosaurs. They thought it was probably a giant iguana lizard. It was only later that experts realised it was a plant-eating dinosaur. Remains of *Iguanodon* have been found in what would have been marshy areas of Europe. Evidence now indicates that *Iguanodon* probably lived in herds, feeding together on the rich vegetation to be found in Cretaceous times, such as horsetails, ferns and cycads.

Is it true **that *Iguanodon* could swim?**

Some scientists believe *Iguanodon* must have been able to swim because it travelled so far. In those days, Europe had many large islands separated by shallow seas. *Iguanodon* could have swum across the narrowest channels.



The iguanodontids lived during the Late Jurassic and Cretaceous Periods. These dinosaurs were all large, heavy animals with broad feet. Their strong hands had fingers ending in flat, hoof-like nails for walking on all-fours.

ALL IN THE FAMILY

Since *Iguanodon* was named, many more similar-looking dinosaurs have been found. These dinosaurs are all members of the same iguanodontid family.

FIRST AND LAST

Camptosaurus was the first iguanodontid. It appeared just under 150 million years ago at the end of the Jurassic Period. *Iguanodon* arrived in the Early Cretaceous Period and was still around 20 million years later. It was the most successful of the lizard-teeth. *Ouranosaurus, Probactrosaurus* and *Muttaburrasaurus* flourished in the Mid Cretaceous Period.

BIGGEST AND BEST

Iguanodon was the giant of the family. It is also one of the best known dinosaurs. The mighty plant-eater was over 9m long and 5m high – as big as a double-decker bus.

HEAVY-WEIGHTS

Muttaburrasaurus, Ouranosaurus and *Camptosaurus* were just as heavily built as *Iguanodon*. But they were about 2m shorter.

FAR AND WIDE

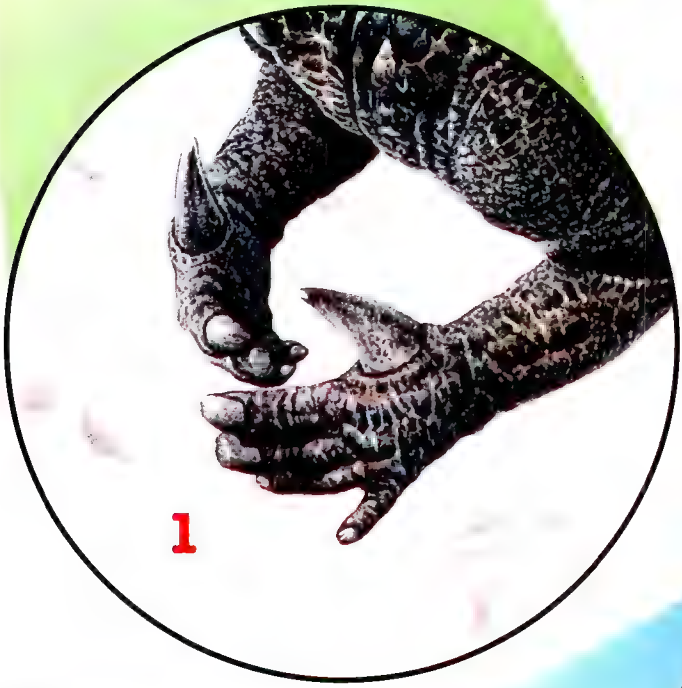
Lizard-teeth dinosaurs are mainly found in the northern continents but remains have been discovered right across the world. *Iguanodon* probably evolved in western Europe. It then spread to Asia and as far north as Norway. *Camptosaurus* has been found in North America, as well as in Europe. *Ouranosaurus* was dug out of the sands of the Sahara Desert in West Africa. *Muttaburrasaurus* is the only iguanodontid to have been found in Australia.

IGUANODONTID CHECKLIST

- LARGE HORSE-LIKE HEAD
- HEAVY BODY
- LONG TAIL

1 THUMBS UP

Lizard-teeth possessed a lethal weapon. It was a spur-like claw on the first finger of each hand. The bulky plant-eaters needed some way of defending themselves. They were too big to outrun speedy meat-eaters. But if they were cornered, they could strike out with their fearsome thumb spikes. Experts believe that *Iguanodon* must have been more than a match for most predators. It could have caused terrible injuries to the eyes, face and neck of its attacker with a well-aimed spike.



2 ODD ONE OUT

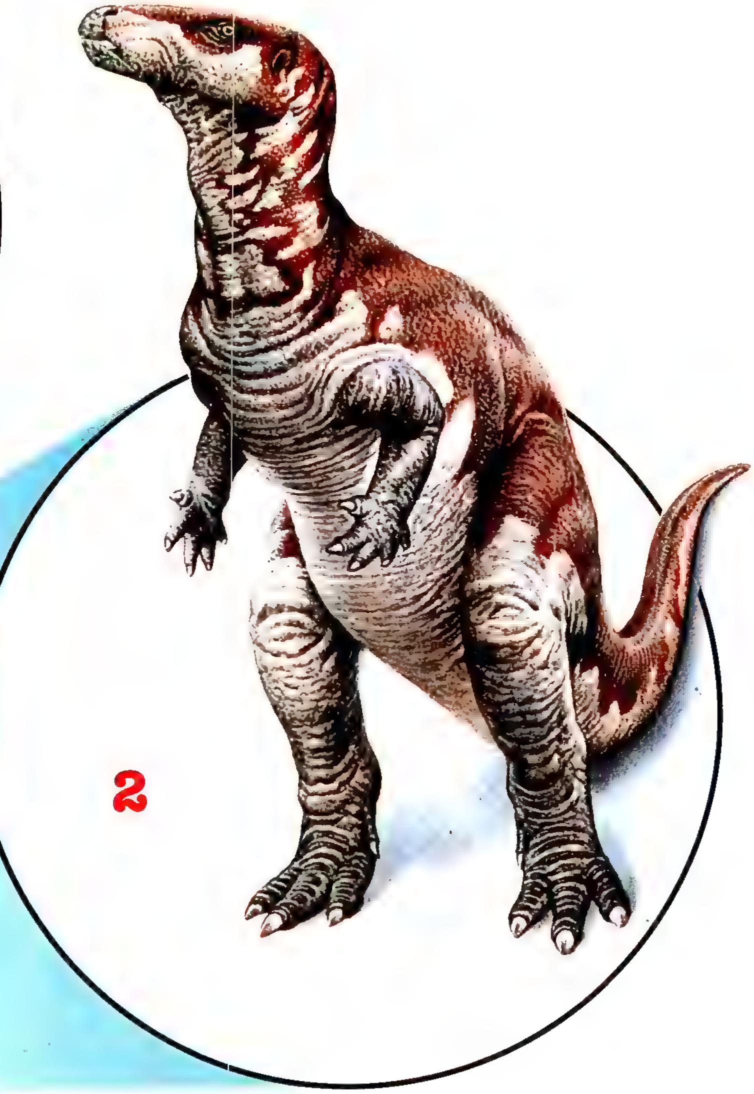
Not all the iguanodontids could defend themselves with a vicious stab. The earliest family member, *Camptosaurus*, did not have a fully developed thumb spike. It was more primitive than the later lizard-teeth in other ways, too. It was smaller than the other iguanodontids and had four toes on each foot rather than three like *Iguanodon*. Like the others, however, it had small hoofs on both its fingers and toes to help it walk on all fours.

CROPPING AND GRINDING

Why were the iguanodontids so successful? Experts believe that it might have been because they could use their broad beaks to crop foliage quickly and efficiently. And the iguanodontid dinosaurs had a large number of cheek teeth, which meant they could grind up a great deal of food at once.

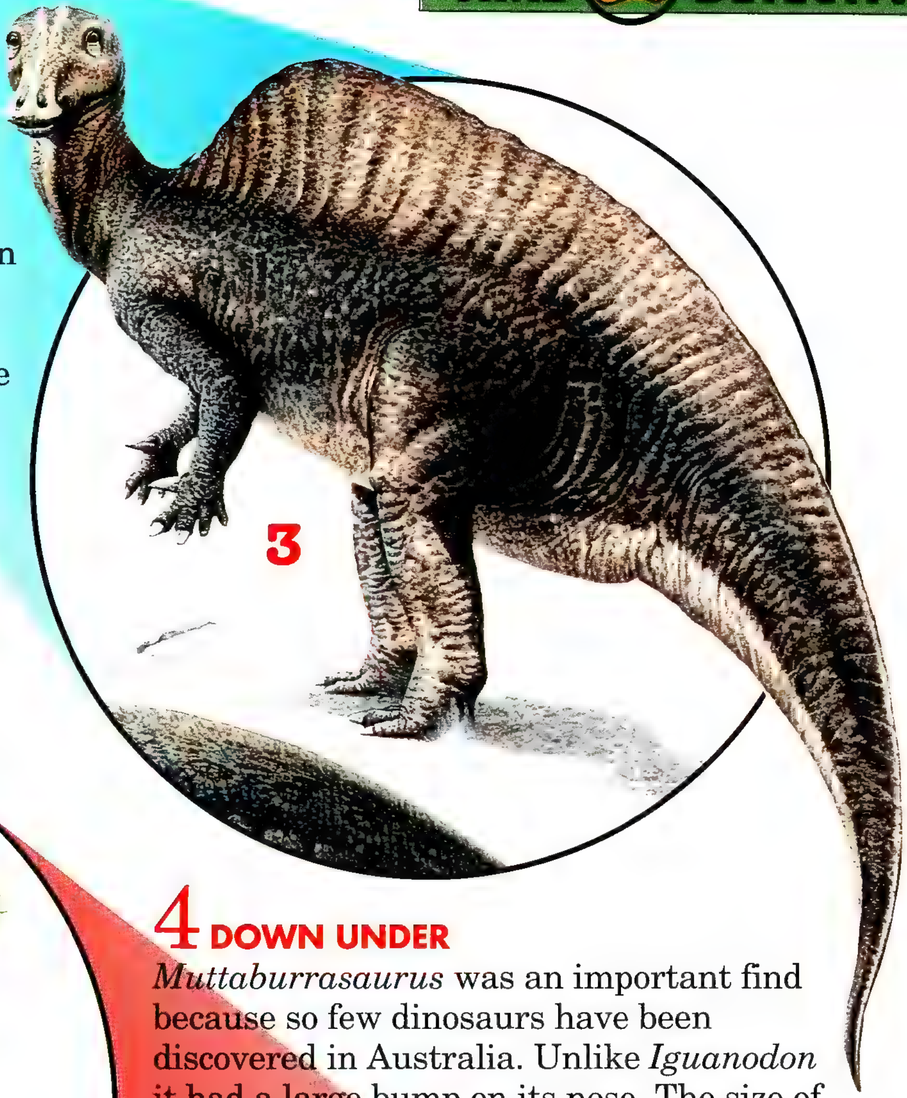
MORE SUCCESSFUL

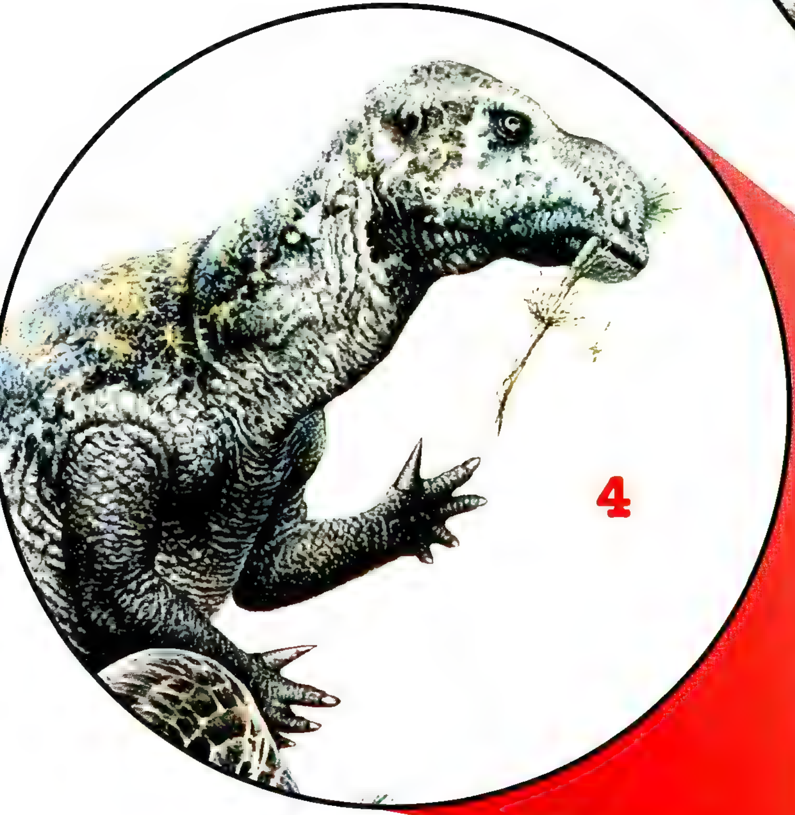
Iguanodontids were more efficient feeders than the long-necked sauropods. Towering giant sauropods, such as *Diplodocus*, had to grind their food down in their huge stomachs. So it took them much longer to digest the tough plants they ate.



3 SAILING ALONG

Ouranosaurus was related to *Iguanodon*. But it looked very different. A spectacular skin 'sail' ran down its back, supported by a 'fence' of bony spines. Scientists think the tall crest probably helped to keep the dinosaur's body at the right temperature. If it was too hot, *Ouranosaurus* could lose heat through its sail. If the weather was too cold, it could angle its crest to take as much heat as possible from the sun.





4 DOWN UNDER

Muttaburrasaurus was an important find because so few dinosaurs have been discovered in Australia. Unlike *Iguanodon* it had a large bump on its nose. The size of its nose has puzzled experts. Perhaps it helped *Muttaburrasaurus* to have an extra good sense of smell. Or maybe it distinguished a male from a female.

IT'S A FACT

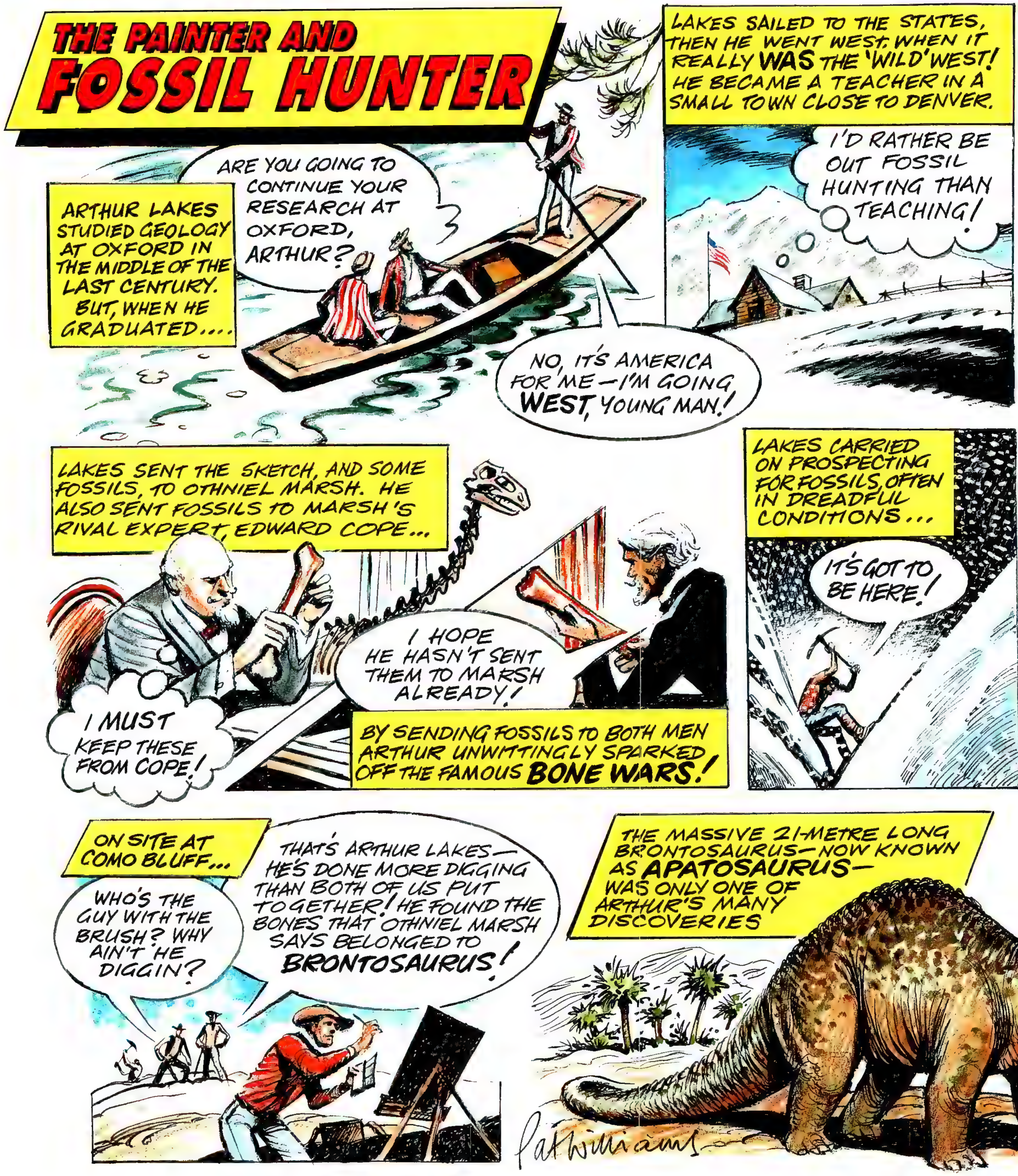
MULTI-PURPOSE

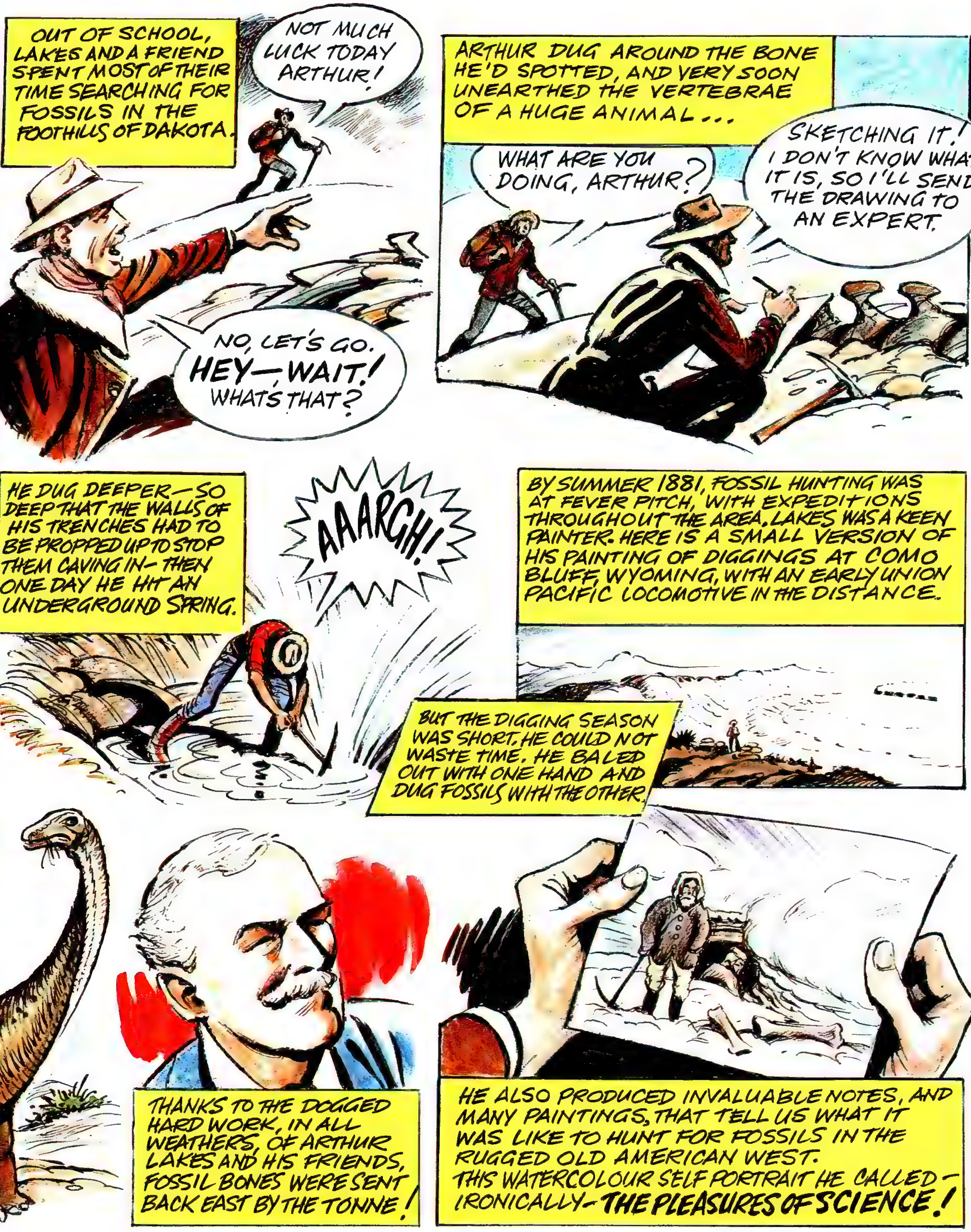
Iguanodontids had very special hands that could be used in many different ways. Their thumb spikes may have been used as defensive weapons. The dinosaurs probably walked on their middle fingers when they were on all fours. These fingers were strong and hoof-like.

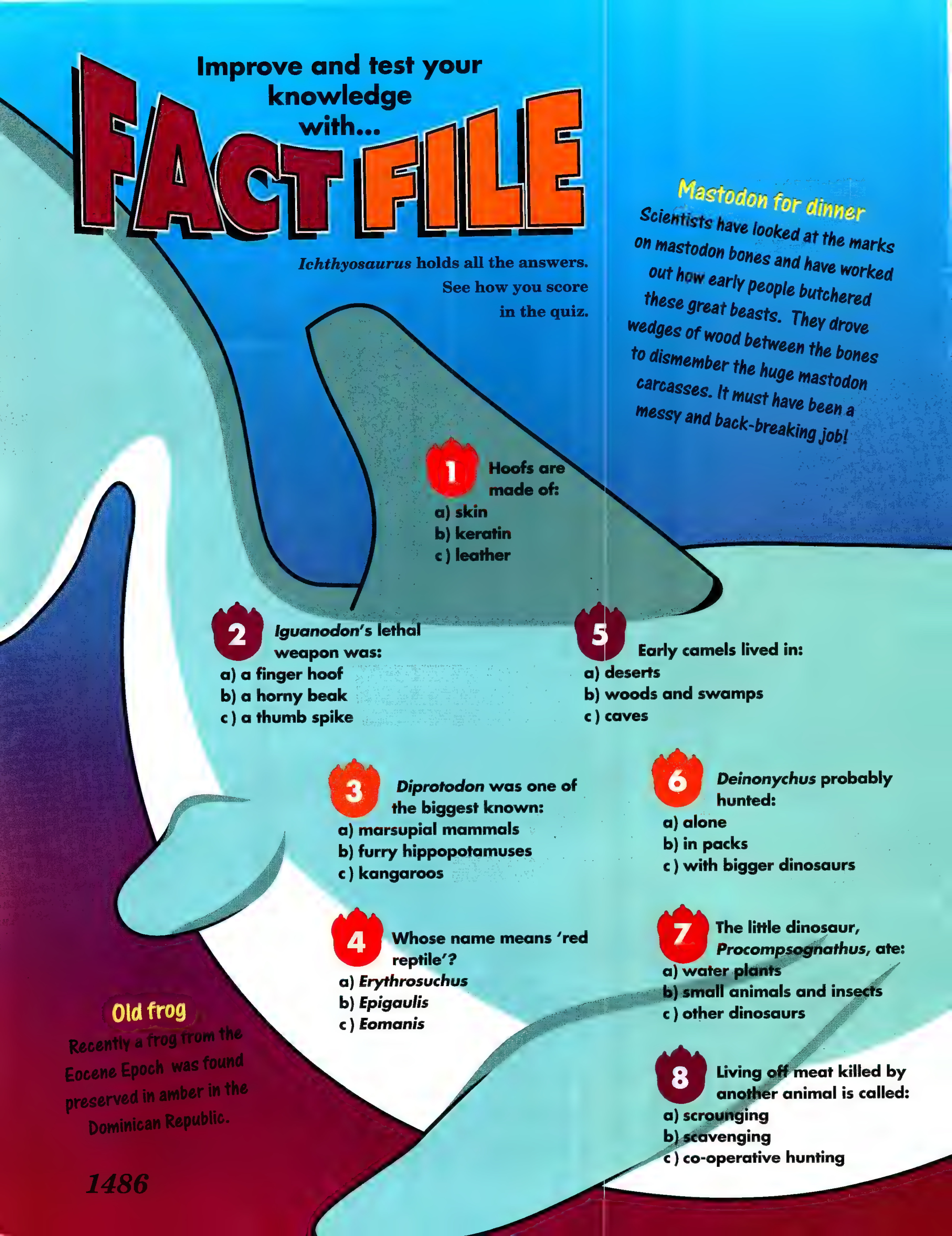
IGUANODONTID CHECKLIST

- SPIKED THUMB
- ATE PLANTS
- BROAD, HORNY BEAKS

THE PAINTER AND FOSSIL HUNTER


ARTHUR LAKES STUDIED GEOLOGY AT OXFORD IN THE MIDDLE OF THE LAST CENTURY. BUT, WHEN HE GRADUATED...
ARE YOU GOING TO CONTINUE YOUR RESEARCH AT OXFORD, ARTHUR?
NO, IT'S AMERICA FOR ME — I'M GOING WEST, YOUNG MAN!
LAKES SAILED TO THE STATES, THEN HE WENT WEST, WHEN IT REALLY WAS THE 'WILD' WEST! HE BECAME A TEACHER IN A SMALL TOWN CLOSE TO DENVER.
I'D RATHER BE OUT FOSSIL HUNTING THAN TEACHING!
LAKES SENT THE SKETCH, AND SOME FOSSILS, TO OTHNIEL MARSH. HE ALSO SENT FOSSILS TO MARSH'S RIVAL EXPERT, EDWARD COPE...
I MUST KEEP THESE FROM COPE!
I HOPE HE HASN'T SENT THEM TO MARSH ALREADY!
BY SENDING FOSSILS TO BOTH MEN ARTHUR UNWITTINGLY SPARKED OFF THE FAMOUS BONE WARS!
LAKES CARRIED ON PROSPECTING FOR FOSSILS, OFTEN IN DREADFUL CONDITIONS...
IT'S GOT TO BE HERE!
ON SITE AT COMO BLUFF...
WHO'S THE GUY WITH THE BRUSH? WHY AIN'T HE DIGGIN?
THAT'S ARTHUR LAKES — HE'S DONE MORE DIGGING THAN BOTH OF US PUT TOGETHER! HE FOUND THE BONES THAT OTHNIEL MARSH SAYS BELONGED TO BRONTOSAURUS!
THE MASSIVE 21-METRE LONG BRONTOSAURUS — NOW KNOWN AS APATOSAURUS — WAS ONLY ONE OF ARTHUR'S MANY DISCOVERIES
Pat Williams


OUT OF SCHOOL, LAKES AND A FRIEND SPENT MOST OF THEIR TIME SEARCHING FOR FOSSILS IN THE FOOTHILLS OF DAKOTA.
NOT MUCH LUCK TODAY ARTHUR!
NO, LET'S GO. HEY—WAIT! WHAT'S THAT?
ARTHUR DUG AROUND THE BONE HE'D SPOTTED, AND VERY SOON UNEARTHED THE VERTEBRAE OF A HUGE ANIMAL...
WHAT ARE YOU DOING, ARTHUR?
SKETCHING IT! I DON'T KNOW WHAT IT IS, SO I'LL SEND THE DRAWING TO AN EXPERT.
HE DUG DEEPER—SO DEEP THAT THE WALLS OF HIS TRENCHES HAD TO BE PROPPED UP TO STOP THEM CAVING IN—THEN ONE DAY HE HIT AN UNDERGROUND SPRING.
AAARGH!
BUT THE DIGGING SEASON WAS SHORT. HE COULD NOT WASTE TIME. HE BALED OUT WITH ONE HAND AND DUG FOSSILS WITH THE OTHER.
BY SUMMER 1881, FOSSIL HUNTING WAS AT FEVER PITCH, WITH EXPEDITIONS THROUGHOUT THE AREA. LAKES WAS A KEEN PAINTER. HERE IS A SMALL VERSION OF HIS PAINTING OF DIGGINGS AT COMO BLUFF, WYOMING, WITH AN EARLY UNION PACIFIC LOCOMOTIVE IN THE DISTANCE.
THANKS TO THE DOGGED HARD WORK, IN ALL WEATHERS, OF ARTHUR LAKES AND HIS FRIENDS, FOSSIL BONES WERE SENT BACK EAST BY THE TONNE!
HE ALSO PRODUCED INVALUABLE NOTES, AND MANY PAINTINGS, THAT TELL US WHAT IT WAS LIKE TO HUNT FOR FOSSILS IN THE RUGGED OLD AMERICAN WEST. THIS WATERCOLOUR SELF PORTRAIT HE CALLED—IRONICALLY—THE PLEASURES OF SCIENCE!



Improve and test your knowledge with...

FACT FILE

Ichthyosaurus holds all the answers. See how you score in the quiz.

Mastodon for dinner

Scientists have looked at the marks on mastodon bones and have worked out how early people butchered these great beasts. They drove wedges of wood between the bones to dismember the huge mastodon carcasses. It must have been a messy and back-breaking job!

1 Hoofs are made of:

a) skin
b) keratin
c) leather

2 *Iguanodon*'s lethal weapon was:

a) a finger hoof
b) a horny beak
c) a thumb spike

3 *Diprotodon* was one of the biggest known:

a) marsupial mammals
b) furry hippopotamuses
c) kangaroos

4 Whose name means 'red reptile'?

a) *Erythrosuchus*
b) *Epigaulis*
c) *Eomanis*

5 Early camels lived in:

a) deserts
b) woods and swamps
c) caves

6 *Deinonychus* probably hunted:

a) alone
b) in packs
c) with bigger dinosaurs

7 The little dinosaur, *Procompsognathus*, ate:

a) water plants
b) small animals and insects
c) other dinosaurs

8 Living off meat killed by another animal is called:

a) scrounging
b) scavenging
c) co-operative hunting

Old frog

Recently a frog from the Eocene Epoch was found preserved in amber in the Dominican Republic.

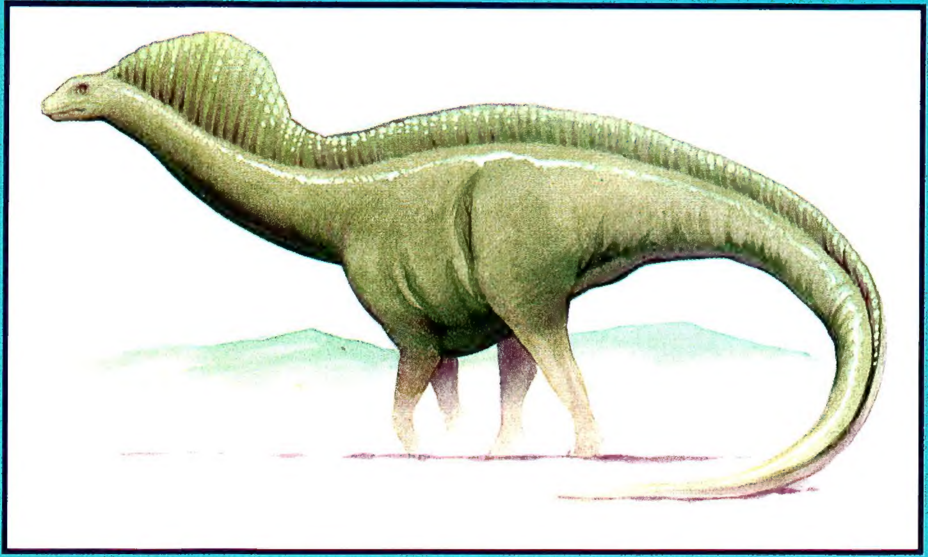
Dinos in Central Park?

The sculptor Waterhouse Hawkins, who built the dinosaurs for the park at Crystal Palace in London, England, was invited to build models of the newly-discovered American dinosaurs for Central Park in New York in 1886. Unfortunately the project was never completed.

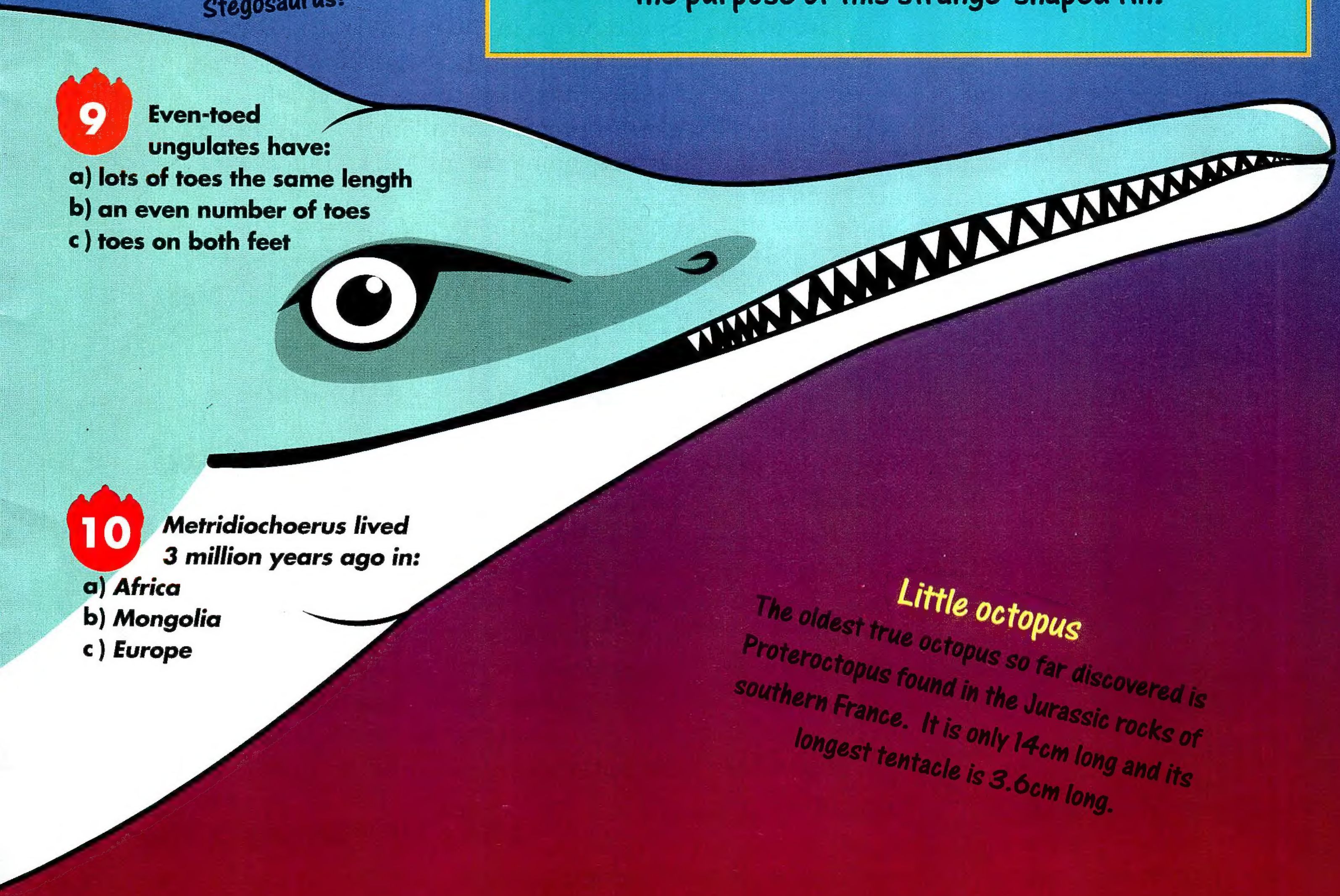
Famous fossil

You probably know that each American state has its own state flag. Well, the state of Colorado in the USA has its own state fossil - Stegosaurus!

Sauropod with a fin!



Amargasaurus is a 9m long plant-eater from late Cretaceous Argentina. It has a very unusual sail-like ridge on its neck and back. Experts have yet to discover the purpose of this strange-shaped fin.



9 **Even-toed ungulates have:**

a) lots of toes the same length
b) an even number of toes
c) toes on both feet

10 ***Metridiochoerus lived 3 million years ago in:***

a) *Africa*
b) *Mongolia*
c) *Europe*

Little octopus

The oldest true octopus so far discovered is Proteroctopus found in the Jurassic rocks of southern France. It is only 14cm long and its longest tentacle is 3.6cm long.

Answers to the questions on inside back cover

A to Z OF PREHISTORIC ANIMALS EO – EU

EOGYRINUS 350 MYA

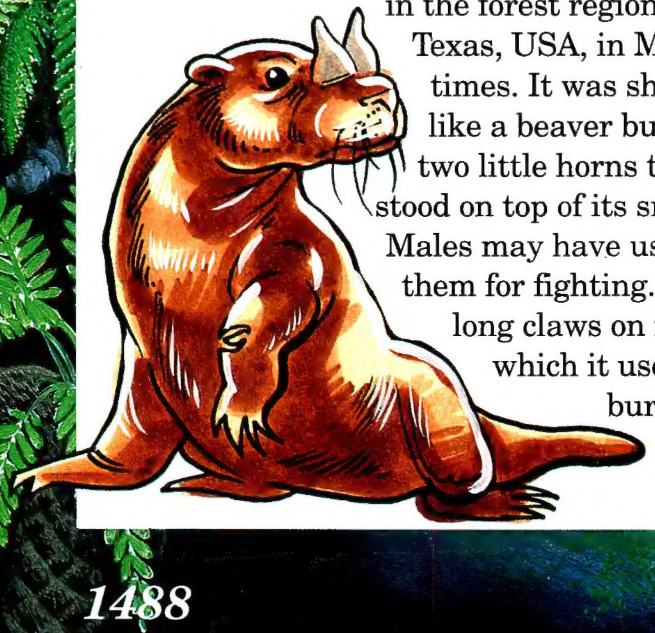
Eogyrinus (ee-o-jih-rine-us) was an early amphibian that was well suited to life in the water. It was a good swimmer, but its short limbs slowed it down on land. *Eogyrinus* had a flat tail, a long body and a crocodile-like head. Its name means 'early amphibian'.

EOMANIS 50 MYA

Fossils of *Eomanis* (ee-o-man-is), a scaly anteater, were found in Germany in 1978. This surprised experts as modern anteaters are only found in Africa and Asia. *Eomanis* was slightly longer than a squirrel and its body was covered with scales. It ate both insects and plants. Its name means 'early pangolin'.

EPIGAULUS 20 MYA

Rabbit-sized *Epigaulus* (ep-i-gawl-us) lived in the forest regions of Texas, USA, in Miocene times. It was shaped like a beaver but had two little horns that stood on top of its snout. Males may have used them for fighting. It had long claws on its feet which it used for burrowing.



ERYOPS 260 MYA

Eryops (er-ee-ops) lived in the shallow waters of Oklahoma and Texas, USA, in the early Permian Period. An amphibious reptile, it was about as long as a modern zebra and fed on small reptiles and fish. Its strong legs supported it on land.

ERYTHROSUCHUS 220 MYA

Longer than a modern rhinoceros, *Erythrosuchus* (er-ith-ro-sook-us) was the largest flesh-eater of its time. It lived in South Africa in the Early Triassic Period and fed on plant-eaters such as *Lystrosaurus*. A thecodont (socket-toothed) reptile, *Erythrosuchus* had a long body and short legs. Its name means 'red reptile'.

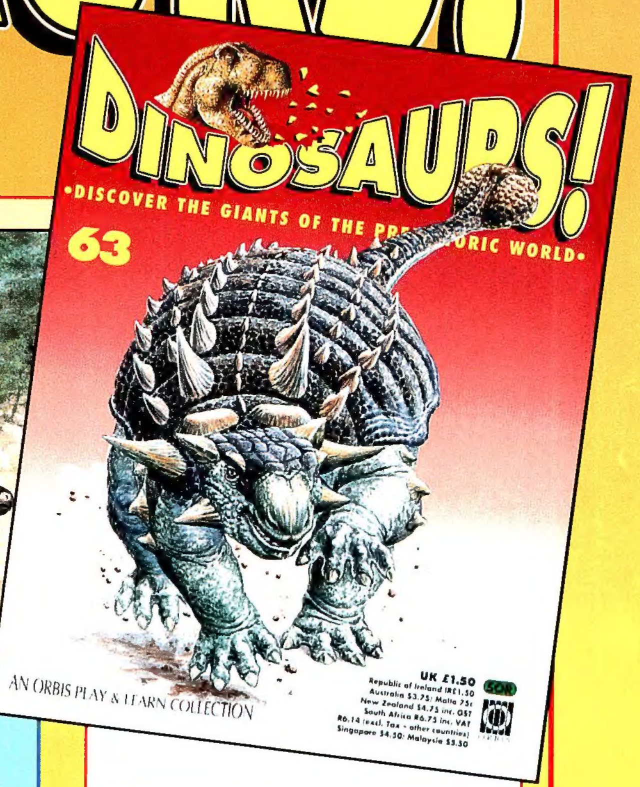
EUSTHENOPTERON 350 MYA

Eusthenopteron (yoos-then-op-ter-on) was a flesh-eating fish that swam in fresh water in Europe and North America in the Devonian Period. It had paired fins and a tail fin with three 'prongs', but its skull, back and limb bones looked like those of early amphibians. *Eusthenopteron* grew up to 60cm long. It may have been the first fish to come out of the water and crawl about on land.

MYA = MILLION YEARS AGO

COMING IN PART 63 OF

DINOSAURS!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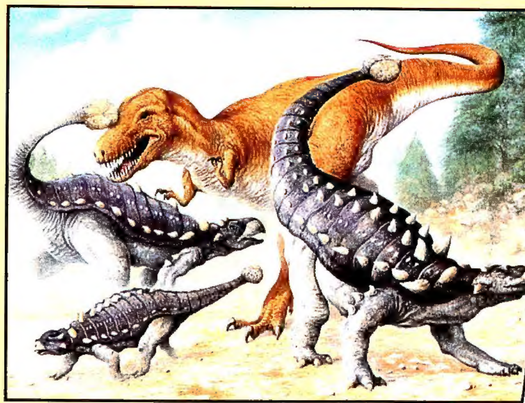
Read about the world of gases and volcanoes 4,000 MYA in PREHISTORIC WORLD. Meet one of the last of the armoured dinosaurs in IDENTIKIT.



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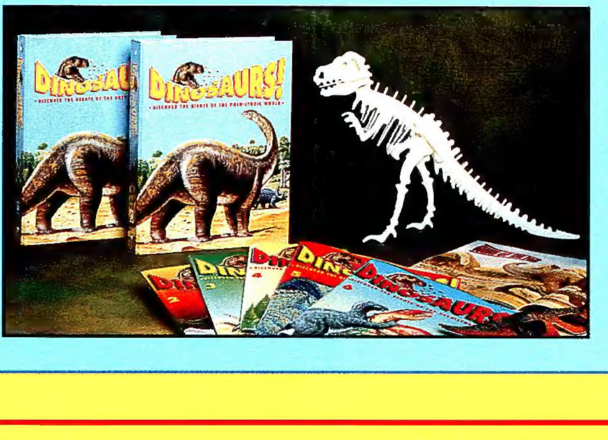

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ANSWERS TO FACT FILE QUESTIONS: 1.b 2.c 3.a 4.a 5.b 6.b 7.b 8.b 9.b 10.a

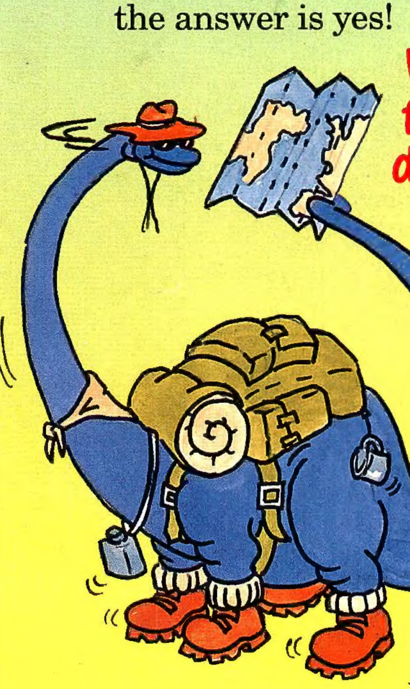
ASK THE EXPERT

Dr David Norman of Cambridge University answers your dinosaur questions

Did people kill off the big Ice Age mammals?

There is no doubt that early human hunters killed Ice Age mammals. However, whether humans actually caused the extinction of these creatures is not certain. I think it is suspicious that the rise and spread of early humans around the world coincides roughly with the extinction of many of the large Ice Age mammals. So my general feeling is that the answer is yes!

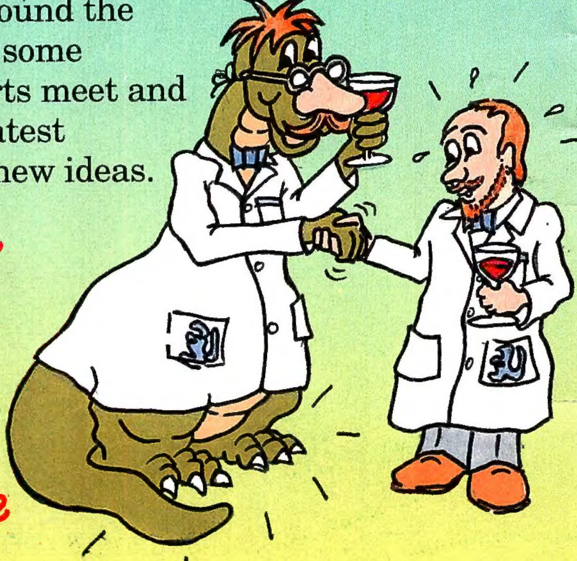
Which was the most far-ranging dinosaur?



Iguanodon has been found as far away as North America, Europe and Mongolia. *Brachiosaurus* has been found in North and South America. But which one spread the furthest? I can't be sure.

Do dinosaur experts ever meet and exchange ideas and theories?

Yes, they do, although perhaps not as often as some of us would like. But every year there are meetings of scientific societies in various countries around the world, where some dinosaur experts meet and discuss their latest discoveries or new ideas.



If 'theropod' means 'mammal footed', what is so mammal-like about a theropod's foot?

Theropod actually means 'beast foot'. The name 'beast' is often used when naming fossils and living mammals. Similarly, 'saurus' has been used for reptiles. In the case of theropod, the name refers to the 'beastly' nature of the foot, which was designed for walking and killing, with its big curved claws.

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